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THE NAVAL AVIATION SAFETY REVIEW

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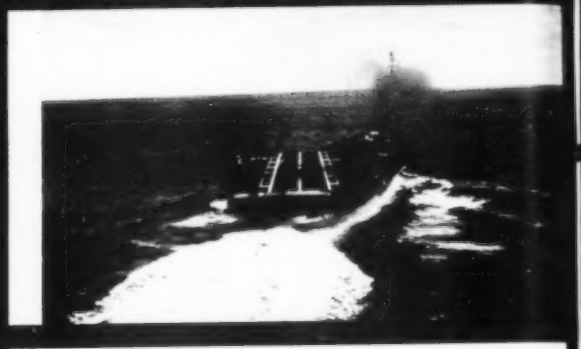
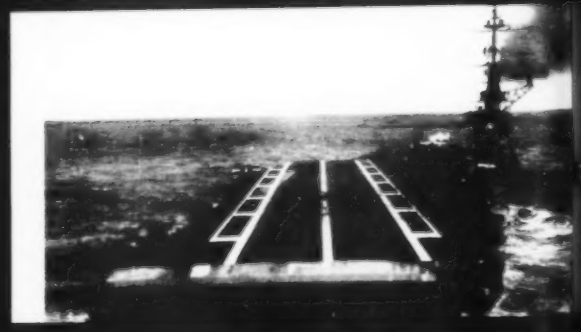


What's New in Visual Landing Aids



This is FLOLS!

by LCDR Jack H. Nelson

Within recent months a new visual landing aid has appeared in the Fleet which utilizes the relatively new Fresnel Lens Optical Landing System (FLOLS) and a new concept in the method of raising and lowering the glide slope. This new VLA is called the Mark VI Mod O Two Degrees of Freedom FLOLS. In the interest of safety and in order to utilize this aid most effectively, pilots must understand the peculiarities that exist with this system which distinguishes it from the mirror OLS. Prior to any discussion of the Mk VI we should first talk about the original prototype Fresnel lens systems, the single degree of freedom Mk V FLOLS.

Continued

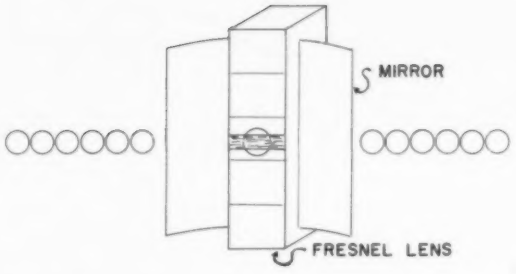


Fig. 1 Fresnel presentation superimposed on mirror presentation.

Mark V Mod O FLOLS

The Mk V Mod O FLOLS is not new to some of you West Coast tailhookers because it has been aboard the USS RANGER for more than two years. For those of you who have not seen the FLOLS, just imagine it as a narrow mirror with a presentation of meatball and datum bars which looks similar to the mirror OLS as shown in figure 1. Instead of a round meatball being produced by a mirror and sourcelight arrangement, a bar-shaped meatball is produced by lens and integrated sourcelight. Actually, there are five separate lens cells, one on top of the other, resulting in what appears to be a continuous lens a little over a foot wide and approximately four feet high. Both the mirror and FLOLS systems have a vertical glide slope spread of 1½ degrees and, therefore, have the same sensitivity to glide slope error.

The Mk V Mod O FLOLS installed aboard USS RANGER consists of three separate FLOLS units located 40 feet apart fore and aft along the port deck edge. While in operation only one lens is level with the flight deck at any one time. The remaining two lenses are retracted below the flight deck level to minimize possible damage. Three lenses are available instead of one to provide for a constant hook-to-ramp (H/R) clearance for various airplane hook-to-eye (H/E) values without requiring vertical displacement of the FLOLS. Instead of raising and lowering the unit to move the pilot's eye touchdown point fore and aft on the deck (as is done with the mirror), the unit, in effect, is moved fore and aft by selection of one of the three units (figure 2). Airplanes with large H/E values use the forward unit (Charlie Unit) and airplanes with low H/E values use the after unit (Alpha unit). The glide slope of each unit can be adjusted to give an even greater selection in H/R clearances.

The stabilization for the Mk V Mod O FLOLS utilizes the same principle as the mirror. The glide slope is stabilized at a point 2500 feet aft of the ship and the lens rotates about its lateral axis to compensate for ship's pitch and roll. No compensation is made for ship's motion due to heave. As the pilot approaches the ramp, which increases his distance from the stabilized point 2500 feet aft of the ship, the stabilized glide slope information rapidly deteriorates. During a pitching deck recovery a pilot must average out the meatball oscillations at the ramp in an attempt to maintain his airplane on the desired glide slope.

The primary reason for the installation of the Mk V FLOLS was to provide aircraft carriers with a lightweight, portside OLS which did not present a high obstruction to landing airplanes. This elimination of the starboard side mirror requirement allows more room and flexibility for aircraft handling aft of the island.

Other advantages of the FLOLS installation over the mirror OLS are: it provides pilots with a consistently perceivable meatball inasmuch as it is unaffected by sun reflection, moisture collection and obstructions in front of the sourcelight

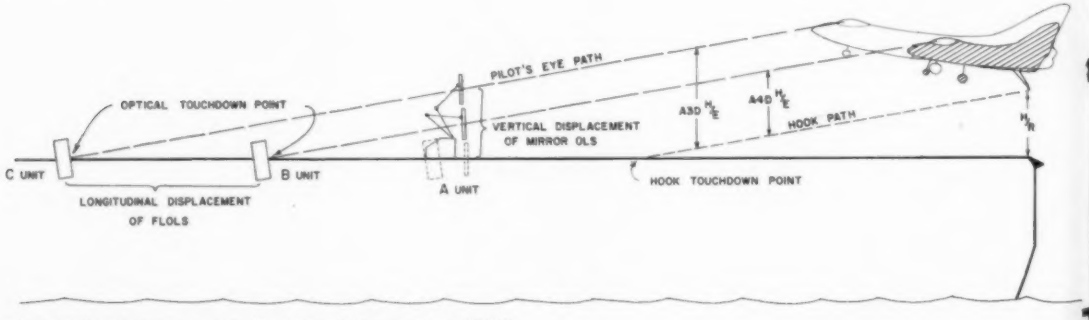
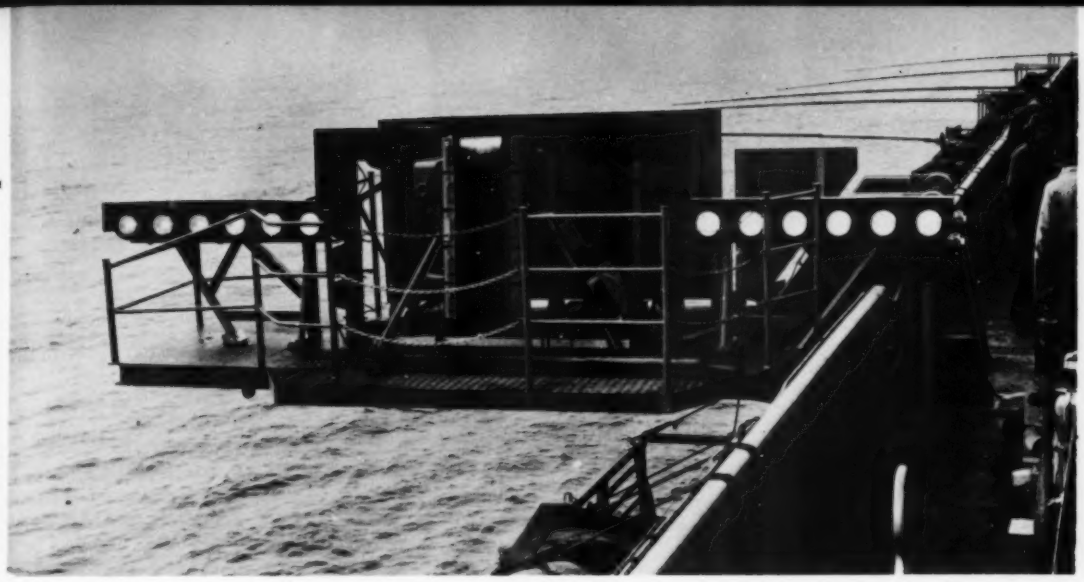


Fig. 2 Displacement of optical touchdown point (Glide Slope) to compensate for various airplane H/E values by either vertical displacement of mirror, or longitudinal displacement of Mk V Mod O FLOLS.



Close-up view of carrier installation of Fresnel Lens.

(aircraft, tractors, personnel, . . .); eliminates loss of night vision of flight deck personnel due to sourcelights.

Mark VI Mod O FLOLS

The first improvement over the now obsolete Mk V FLOLS is the Mk VI Mod O Two Degrees of Freedom FLOLS. The first installation of this unit is aboard the USS FRANKLIN D. ROOSEVELT. Many pilots immediately envision the Two Degrees of Freedom FLOLS as something that has freedom of movement through just two degrees of arc. This is erroneous. The two degrees of freedom refers to rotational movement of the Fresnel lens about two separate axes. Besides being able to pitch fore and aft about its lateral axis, the Mk VI FLOLS can tilt about its longitudinal axis as well (see figure 3—all directions of movement are in relation to the heading of the angled deck). Its range of tilt is 6½ degrees to either port or starboard through an arc of 13 degrees. The datum bars don't move, just the lens box.

Why this additional degree of freedom? Primarily to raise and lower the glide slope over the landing area to accommodate various airplane H/E values. To perform this function the mirror raises and lowers vertically, the Mk V Mod O FLOLS, in effect, moves fore and aft longitudinally, and the Mk VI Mod O FLOLS tilts from side to side. In flying on the mirror or Fresnel lens you are actually flying on a glide slope plane made up of many parallel lines. The line that passes over the centerline of the landing area is one of these lines and is parallel to the centerline of the FLOLS glide slope plane. If we rotate

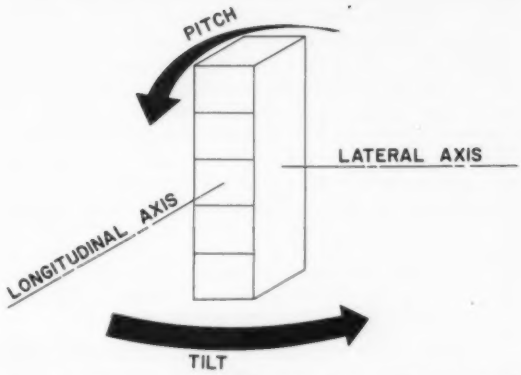


Fig. 3 Movement of the Mk VI Mod O FLOLS about two axes of motion.

the glide slope plane about its centerline as shown in figure 4, then all of the lines on either side of the centerline are either raised or lowered verti-

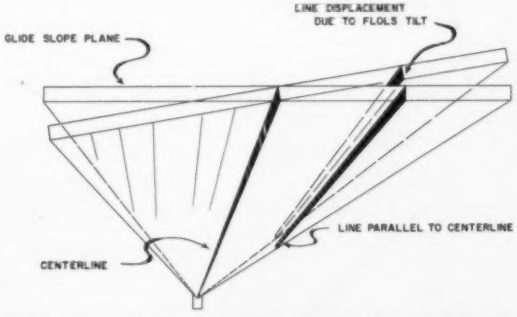
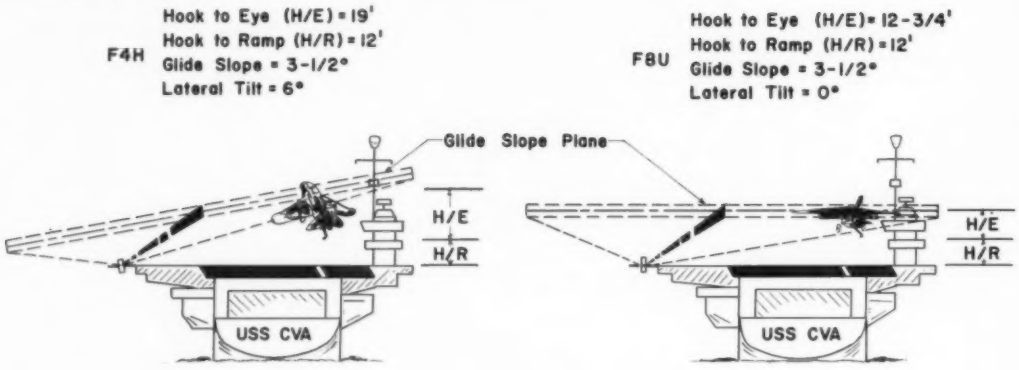


Fig. 4 Vertical displacement of glide slope line due to rotation (tilting) of FLOLS glide slope plane.

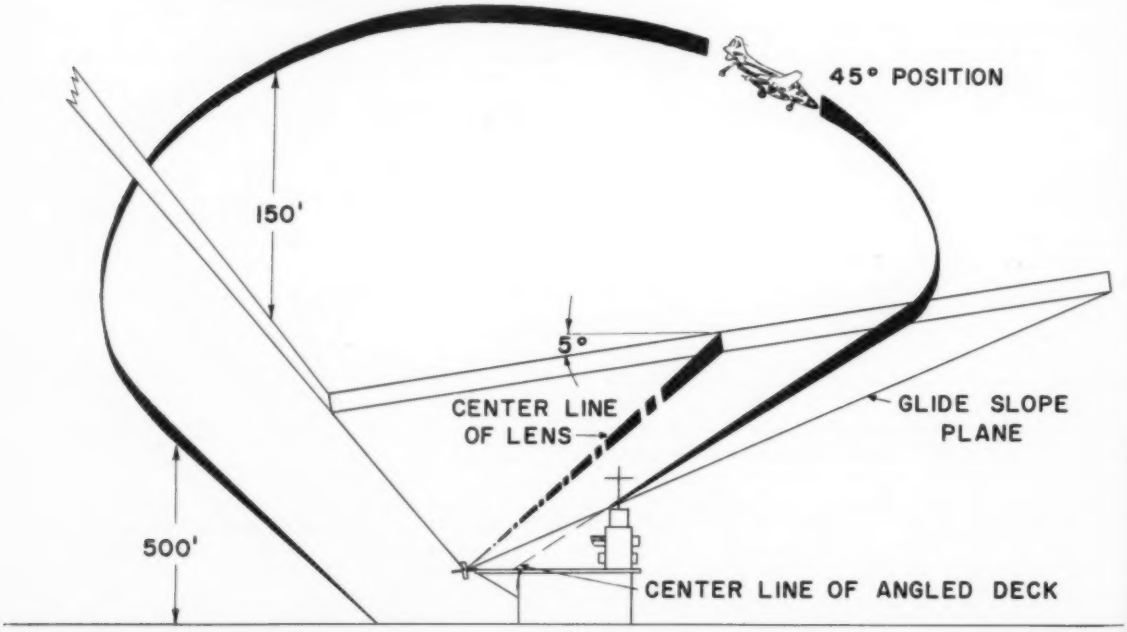
Fig. 5 Displacement of glide slope line by tilting glide slope plane to compensate for variations in airplane H/E values.



cally, the direction and amount depending upon which direction the FLOLS plane rotates and the distance of the line from the centerline. If you happen to be flying on the line which is 57.3 feet from the centerline of the plane, then you will move one foot up or down for each degree of rotation of the plane. A line located farther than 57.3 feet would require less rotation for one foot of displacement. The variation in different airplane H/E values can, therefore, be accommodated for by simplying tilting the FLOLS to one side as shown in figure 5.

Aboard USS F.D.R. the line which passes over the centerline of the landing area is 64 feet to starboard of the FLOLS. For each degree of FLOLS lateral tilt the line which lies directly over the centerline of the landing centerline is displaced approximately 1.1 feet. If we locate the lens on the ship so that it is laterally level for the average fleet airplane H/E, it needs only to tilt to port

Fig. 6 Erroneous glide slope information for large tilt conditions for an airplane displaced from the centerline of the angled deck.



Fresnel Lens indicator assembly source, waveoff and fixed datum lights on. Conditional datum lights off.

Fresnel Lens indicator assembly showing cut, source and datum lights on.

for airplanes with large H/E values and to starboard for airplanes with low H/E values. This is exactly what is done aboard USS F.D.R. The glide slope can be set at any number of angles, so that different variations of tilt and glide slope angle can be used to give the same H/R clearance.

Warning! Note that we have been talking about the line above the centerline of the angled deck. This is the only line in the glide slope plane that gives the correct glide slope information. You can see from figure 5, that for a port tilt condition if you line up left of the centerline, a centered meatball gives you a lower glide slope than desired. If you line up right then you will fly a higher than desired glide slope. If the lens is not tilted, then erroneous line-up will not affect your glide slope. Depending upon the glide slope used and your airplane's H/E value, you may or may not have a tilted FLOLS. To play it safe *always* line up with the centerline of the angled deck.

For large angles of lateral tilt the Two Degrees of Freedom FLOLS may even affect the meatball position during the initial portion of the approach. As seen in figure 6, for a large port tilt, a pilot flying a normal 500-foot approach would see a high meatball through the 45-degree position, even though he was at the proper position and at the right altitude. The reverse would be true of a low H/E valued airplane. It is best not to start flying the meatball too soon during the approach to the Two Degrees of Freedom FLOLS. Wait until you are approaching the line above the centerline of the landing area where the presentation you see is truly informing you where you are in relation to the desired glide path. If you are flying a low H/E valued airplane and you observe a low meatball as you pass through the 45-degree position, then you can be fairly certain that you are below the glide path. Otherwise don't rush it.

The stabilization of the Mk VI Mod O FLOLS is similar to the mirror or Mk V Mod O FLOLS. The line which passes over the landing area is stabilized on a point 2500 feet aft of the ship. The advantages of the Mk VI FLOLS over that of the mirror OLS are the same as those listed for the Mk V. The Mk VI has one advantage over the Mk V in that it requires only one Fresnel lens instead of three.

Again: When flying the Mk VI Mod O Two Degrees of Freedom FLOLS, remember that you must be lined up with the centerline of the angled deck if you want to be assured that you are receiving accurate glide slope information. *Watch your line-up!!* ●

LCDR Nelson was commissioned in June 1952. After his first tour of sea duty as ship's company aboard USS MT MCKINLEY he was ordered to flight training and received his wings in December 1954. He was assigned to VS-21 and made a WestPac deployment aboard USS PRINCETON in 1956. Following this he served as an LSO with Air Group 12 which included another WestPac cruise aboard USS LEXINGTON in 1957. After a tour as staff LSO at ComFairAlameda in 1958-59 he was assigned to the Flight Test Division, Carrier Suitability Branch at the Naval Air Test Center, Patuxent River where he has been since November 1959.

Our product is Safety, our process is education, and our profit is measured in the preservation of lives and equipment and increased combat readiness.

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METRO

PUT YOUR OWN KNOWLEDGE TO WORK

Some months back an Air Force unit tried a small experiment in pilot weather briefing. It worked this way: Duty pilots came into the weather office, did their own weather briefing, filled in the DD175 and walked out without talking to a forecaster. (A forecaster was available if help was needed.) The program was run under a special waiver in case you're wondering about regs.

Now suppose you tried this experiment yourself—no, the weather guesser's union won't protest at this attempt to cut them out of the pattern. If the day of "do-it-yourself" briefing ever comes to Naval air, all that might happen would be a rearrangement of people—more analyzing and forecasting in the back room and less talking over the sequence reports out front.

Imagine that all the bedrock decisions on "go—no go" or alternates will be made on your own judgment after a personal examination of weather material. Then after doing this, discuss it, check with the weatherman and hand him your clearance.

First attempt at a self-briefing might rattle your confidence. When the Air Force test began, pilots had plenty of trouble reading sequence reports and deciphering standard airway codes. One incidental result: self-briefing sharpened the pilots considerably.

Beyond this temporary roadblock may lie another. Simply being able to read a teletype sequence report or forecast is no guarantee that you will be able to integrate it with other information to begin creating a mental picture of the weather situation at hand. Without some sort of understanding on what is happening, it's easy to end up with a grab-bag of disconnected bits of information which could only confuse the issue.

Some difficulty in this "picture-making" process may be caused by what appears to be the large amount of material displayed around the weather office. To remedy this a quick refresher on available weather information is recommended. It can be done from several chapters in "Meteorology for Naval Aviators" and the "All-Weather Flight Manual." Check through both of them.

These manuals recognize the pilot's limitations in self-briefing and point out his objective; he is not expected to be a meteorologist but must have enough understanding of the subject to make intelligent decisions. This involves nothing more than following a procedure for checking material which is displayed in the weather office.

Such a procedure is set down in Chapter 14 of "Meteorology for Naval Aviators." It can be modified to suit an individual preference; however, the important thing is the development of a routine, or habit if you like, which allows you to build a picture of the weather in a logical and systematic way.

Begin with the synoptic maps—upper air and surface. The manual explains what to look for. Start with the surface map which is on the bottom of the stack and note movements of fronts and pressure systems as you work up to the latest map. In this way a general "trend" of the main weather is shown.

Step two would be an examination of the prognostic (prog) surface charts which forecast the expected position and orientation of fronts and pressure systems.

With past and future as a background, move on to the current sequence reports to see what is happening now. Follow this up with winds aloft (you may want to compare them with forecast winds aloft).

Finally there are the current forecasts to check; regional, area and terminal. Each of these contains a specialty not found in the others and none of the three should be overlooked.

At first, a self-briefing will take a few extra minutes to get used to the routine but with practice the time will shorten. ●

LETTERS TO THE EDITOR

Illuminating a Kneeboard

FPO San Francisco—I have found a method of illuminating my kneeboard which has been copied by a number of squadrons. Here are the details . . . some other Marine or Navy pilot might find good use for this kneeboard modification. Parts list:

1. Section H Page 52 Stock No. R7520-526-2671-V170 Board: Pilot's Clip Item 2380
2. Section H Page 45 Stock No. G6230-223-4547 Flashlight: Penlight with Lanyard Item 2095
3.* IPB F4D-1 February 1959 Page 493 Figure 142 Item 13 Light Assembly Stock No. RN6220-572-6395-DGMC.
4.* IPB F4D-1 February 1959 Page 456 Figure 134 Item 31 Console Light Socket Stock No. R6210-283-9708-D336.

*These items although listed in F4D-1 IPB are common items for all aircraft and may be found in other IPBs.

Instructions for Assembling

First, remove metal cover from penlight head. Then cut the threaded portion of light assembly socket; the remaining is a perfect press fit in the penlight head. Attach the wire as shown to the floodlight, by soldering a wire to top lug of penlight body a positive ground is affected for mounting to either a metal or plastic kneeboard. The penlight is fastened to the kneeboard with aluminum clamps and self threading screws.

The floodlight base is bent to fit the curvature of the kneeboard head and secured to it with screws or it may be riveted. The original lens of the floodlight is quite dense, therefore substitute cutouts from a plastic flashlight magnifying lens and a red plastic lens.

In order to keep a standard flashlight bulb in place use a spring, as shown in the photograph. The spring can be secured by recessing it in the floodlight hood. This is accomplished by drilling a recess a few thousandths smaller than the spring used and pressing the spring into place.

I have also substituted small mercury batteries in lieu of the normal penlight battery. The batteries I am using now are over six months old. The entire assembly can be fabricated from items in the supply system.

P. N. SAMARAS, CAPT, USMC

RCAF Phytness Plan

Port Washington, New York—Having reached the age of 30 and being slightly overgross (10%), I decided to approach the weight-conditioning survival problem with something more effective than half hearted diets and sporadic physical exercise. I determined to avail myself of the copious data compiled by researchers in this area and apply it intelligently. (Sounds great, doesn't it?) As it turns out, I am a serandipiter which means that one day I am sorting through my IN basket at my usual rate of 1,200 WPM when I stubbed my eyeballs on an odd looking article in ALPA's Magazine. At first I thought someone had mispelled SEX. As I slowed to 800 WPM (for better comprehension), I made out the letters 5BX A Plan For Physical Fitness.

It seems that RCAF has come up with something more effective than lip service editorials in reply to this fitness flap.

Basically, the plan consists of sets of progressive exercises tailored to meet the individual's requirements of age and type. The beautiful part of the whole plan is that it only takes 11 minutes per diem—oops I mean per day, and is adaptable to group type effort (all together now, boys, by the numbers).

The plan is available by send-

APPROACH welcomes letters from its readers. All letters should be signed though names will be withheld on request. Address: APPROACH Editor, U. S. Naval Aviation Safety Center, NAS Norfolk, Va. Views expressed are those of the writers and do not imply endorsement by the U. S. Naval Aviation Safety Center.

ing 35 cents American to Queen's Printer, Ottawa, Canada (CAT. No. DC72-1). No! I am not getting 10%. In fact, I got so excited I ordered two. One copy of which I am forwarding gratis for your perusal, retention and I hope utilization and dissemination.

JOHN F. MC CABE III, LT
U. S. Naval Training Device Center

● The topic is now covered by an OpNav. APPROACH plans to reproduce portions of booklet with the Queen's Printer's okay.

Red Red Face

El Segundo, Calif.—With regard to your letters to the Editor in the August 1961 issue of the APPROACH magazine concerning the photograph appearing in the May issue in which you indicated that both NASC and VMF-15 were red faced over an airplane being fueled with an oxygen cart present. I think your face will be a little bit redder as further examination should prove to you that the cart in question happens to be a dry nitrogen cylinder used for servicing shock struts and other mechanical equipment. The F4D as it happens, uses liquid oxygen. Better luck next time.

H. BAYER
Product Support Manager
Douglas Aircraft Co., Inc.

● APPROACH and perhaps readers Kohler, Waggoner and Martin are still baffled by color coding indicated in black and white photo—see cut. Oxygen is coded green with white stripe. Coding for nitrogen (water pumped) is gray with two black stripes, nitrogen (oil pumped) gray with one black stripe —ref. Mil Standard 101, 14 July 1949. Further, the early F4D did use gaseous oxygen with a filler access near location in pix. Another red face bites the dust.

Such is Life

USS TICONDEROGA—See page 38, APPROACH, Sept. 1961. How many letters have you received inviting your attention to the mechanic so diligently inspecting the accessory section of the AD, and at the same time inviting serious injury or death by carrying that most obvious screwdriver in his hip pocket?

This picture has no place in the finest publication of its kind.

HAROLD L. SMITH, LCDR
Ex-AD Driver and
Squadron Safety Officer

● No other letters to date—but, your point is well taken. APPROACH is remiss, not in publishing the photo, but in neglecting to spotlight the malpractice. Photos published, in nearly all cases, are those furnished by the operators. These reflect conditions as they are, not as they should be. If such conditions didn't exist the billet of Safety Officer would not have been created. Glad to have your opinion of APPROACH

Congratulations GCA 4!

***NAS North Island, Calif.*—Hats off to North Island's GCA-4 for what appears to be an all time Navy record for number of ground-controlled approaches conducted in one month.**

Their 2810 approaches conducted during the month of June this year betters by more than 200 what is believed to be the previous record set by NAS Moffett's RATCC, with approximately 2600 approaches in one month. FOUR considers itself to be the hardest working GCA in the Navy. As far as they know, they're the only GCA working a 24-hour, seven-day week schedule, requiring only a one-minute notice to commence an approach in either IFR or VFR weather.

THE EDITORS

MK-2 Inflation

FPO San Francisco—In the March '61 APPROACH, an answer to one of the letters to the editor stated that BACSEB 35-58 superseded parts of BACSEB 22-58A concerning the position of the MK-2 life preserver oral inflation valve. The answer pointed out the importance of maintaining deflation by keeping all valves CLOSED at all times (particularly the oral inflation tube valve).

According to BACSEB 55-61 (which cancels and supersedes BACSEB 22-58A) paragraph 5.b.(f): Examine the oral inflation valve to insure that the mouthpiece is UNLOCKED to permit immediate oral inflation in an emergency.

Which procedure is correct, the one outlined in BACSEB 55-61 or 35-58?

R. L. MAFFETT, PRCA

● The Bureau of Naval Weapons has advised the Safety Center that BACSEB 55-61, Vest, Life Preserver, Pneumatic, MK-2; instructions for use, maintenance and inspection of, is to be corrected as follows:

Paragraph 5.b.(1)(f)—change the word *unlocked* to *locked* and delete the rest of the sentence.

Murphy Eliminator

El Centro, Calif.—In the Dec. '61 issue of APPROACH, Murphy's Law, page 47, presented an incident of incorrect installation of the slide disconnect cable and main parachute ripcord of the Martin-Baker ejection unit and the correct installation.

The following information amplifies the correct procedure:

a. Determine which cable attaches to the main parachute ripcord by opening the large outboard personnel parachute ripcord D ring flap and moving the outboard D ring; check that the motion is transmitted to the cable which emerges from the aft casing at the left side of the parachute container. Replace the D ring and attach this cable to the release pins of the main parachute.

b. Attach the remaining cable to the slide disconnect pin.

The above procedure is necessary to ensure that the D rings are properly installed to function as designed.

HOWARD C. FISH
U. S. Naval Parachute Facility

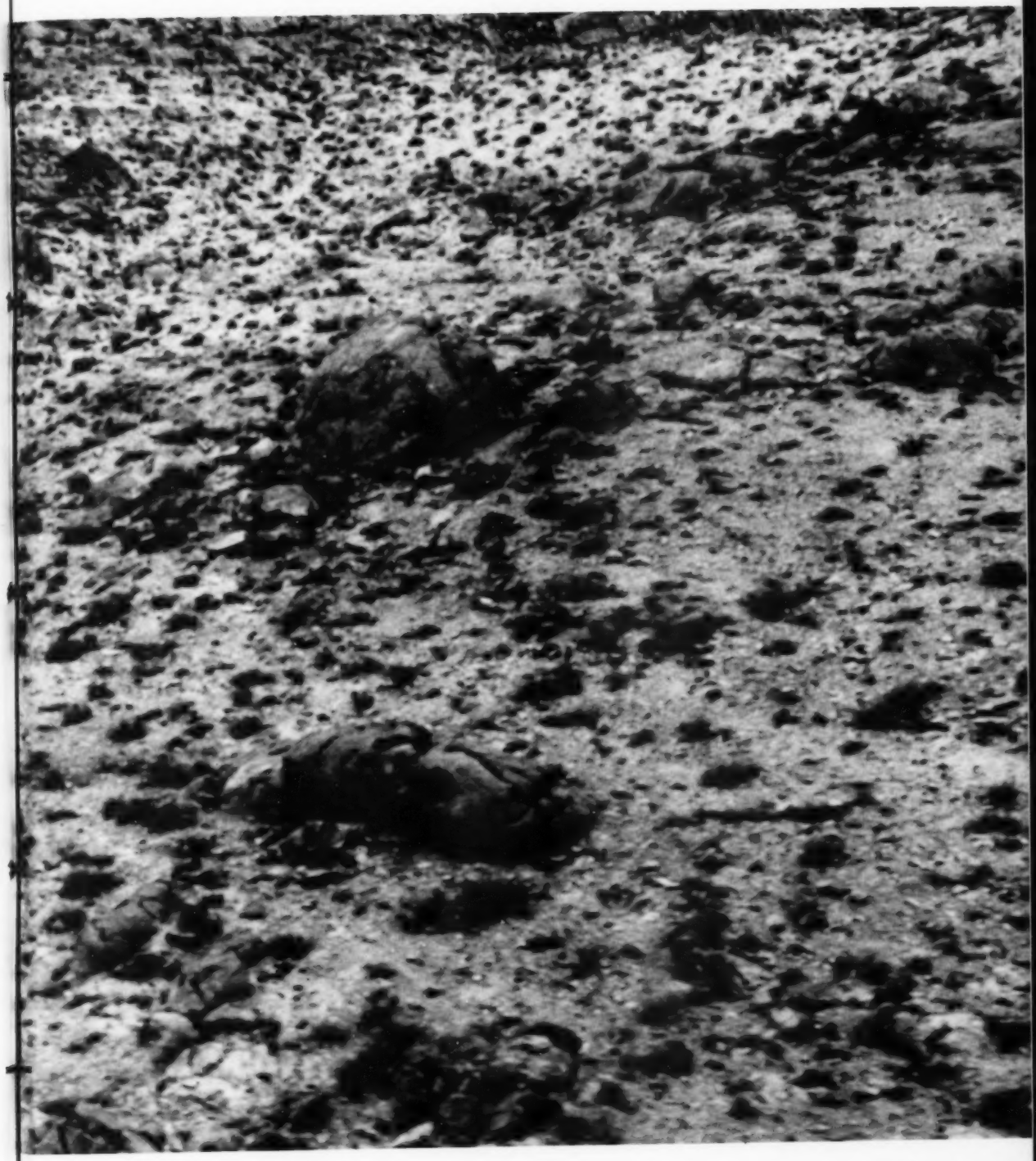
DESERT SURVIVAL

by Capt. J.C. Pinto, MC, USN

During the months of June, July and August temperatures in the vicinity of the Marine Corps Auxiliary Air Station, Yuma, Ariz., exceed 150° F and those in the shade often reach 118° F. Shade temperatures in excess of 100° F with sun temperatures above 140° F occur during the months of May and September. The following briefing material used for pilots and crews at MCAAS, Yuma should be of considerable value to any pilot or crewman flying over the desert. . . .

DESERT survival for pilots operating out of MCAAS, Yuma, in most cases will be translated into a happy and memorable experience due to a successful ejection and rapid recovery by the SAR group. This is expected from professional pilots and professional SAR teams. The SAR group from this station enjoys the reputation of taking only as many minutes as there are miles from the station for a rescue. But, all may not be so lucky . . .

In that case, the challenge will be yours and you should know something about this beautiful yet sinister and unrelenting desert which will extract its full measure from the unwary. Respect the desert in all its vastness and beauty and you will



survive to visit again, maybe as a rockhound.

To be wary and respectful means—obey the laws of the desert:

- CONSERVE SWEAT
- MAKE SHADE
- STAY PUT!

The villains of the desert are high temperature and low humidity. During the months of June, July and August, sun temperatures are in excess of 150°F. Shade temperatures soar to 118°F. Temperatures in May and September are nothing to sneer at—sun temperatures go above 140°F. with shade temperatures rising up to 110°F. Humidity ranges in the low 5% to 10% level. For the unwary, this low humidity is the real villain for it sucks up the sweat causing rapid dehydration.

What is dehydration? Simply put, it means the loss of water from the body. It starts immediately after the last intake of a non-alcoholic drink. Dehydration is prevented by the adequate intake of water.

The body is composed of more than 90% water and needs all of this water to operate efficiently. A loss of only 2½% of body weight through loss of body water reduces efficiency by 25%. (Preventing dehydration or maintaining hydration of the body is important not only in reference to survival under summer desert conditions but also in the efficient operation of your aircraft.)

The body normally dehydrates by losing water through breathing (expiration is practically saturated with moisture), urine, feces and sweating. Fever, diarrhea and vomiting increase dehydration requiring greater amounts of water to maintain a normal state of hydration.

Coffee and alcohol cause dehydration because of their effect upon the kidneys. They are powerful diuretics—that is, they increase the urinary flow thereby causing dehydration. (This explains the "bird cage tongue" and "cotton balls" the morning after.)

In desert survival don't take chances. Keep your water balance up—start hydrating the night before the hop and above all keep your hydration up throughout the day. Take that extra long drink before heading out to the bird.

If you have had a fever or diarrhea or any vomiting, however mild, or if you did have a few the night before and are not feeling up to par—see your flight surgeon and let him make the decision as to whether or not you should take the hop.

It gets awfully hot and dry out there and that gallon of water in your desert survival kit will see you through if you were properly hydrated prior to the flight. You not only lower your chances for desert survival by taking off in a moderately dehydrated condition, but you also risk the success of your mission due to lowered mental and physical efficiency.

How much water to drink under normal operating conditions depends entirely upon the individual. Here at Yuma, depending upon physical effort, it can vary from one to seven quarts per day. A good rule to follow is to produce about

one quart of urine per day or keep the urine light amber in color.

Adding extra salt to the evening meal will satisfy most salt requirements.

Remember the laws of the desert: Conserve Sweat . . . Make Shade . . . and Stay Put. Wartime desert survival accounts repeatedly showed that the weaker men survived while the husky ones died. Why? Because the weaker men stayed behind under shade and rested while the stronger decided to walk out.

Unknowingly the weaker were obeying the laws of the desert—they conserved sweat—they made shade—they stayed put and were easily located and rescued.

The Arab is not surviving in the desert—he lives there—so, take a lesson from the Arab—slow motion and long flowing garments covering the entire body and part of the head. This satisfies the first two laws of the desert—

- By slow motion—minimal exertion—you conserve sweat and energy.
- By draping the parachute over your body you make shade—by using the remainder of the parachute as a tent or canopy you make more shade.
- Remember to get off the ground while resting. It can be 30° cooler one foot above the ground.

You also satisfy the third law when you put up that canopy or tent—for then you will stay put.

Don't peel off your clothing. You may feel cooler by taking off your shirt or letting your flight suit hang down from the waist—but you will be losing more sweat even though you don't realize it. This is because of the dry/low humidity (5%/10%) winds which will dry up the sweat as it appears. Your body then will speed up its production of sweat to remain cool. Serious dehydration can set in before you are aware of it.

Again take a lesson from the Arab. Keep those clothes on. You may feel a bit warmer but you will be getting the full benefit of each cooling drop of sweat by slowing down its evaporation. In the long run you will be just as cool plus the fact that you will remain hydrated or in water balance.

Keep your head covered, get under shade. Remember—sun temperatures get above 140° to 150°F.

Conserve your sweat and not your water. Don't waste water but drink all you want when you want it, preferably on an hour-to-hour basis. It really makes no difference whether you drink your water first or last so drink all you want when you want it and don't try to spread it out. The real danger lies in the progressive loss of judgment, mental efficiency and physical collapse, dying with water in the canteen.

Remember, thirst is the first sign of dehydration but as dehydration worsens, other symptoms such

Survival Times

The table below indicates probable survival times with limited water supplies under conditions of various shade temperatures. If the survivor disregards the basic rules of Sweat Conservation, Shade and Staying Put, the survival time is expected to be less than indicated.

Condition	Max Shade Temp. °F.	Available Water (Qts.) Per Man					
		0	1	2	4	10	
Staying Put	120°	2	2	2	2.5	3	Survival Time (Days)
	110°	3	3	3.5	4	5	
	100°	5	5.5	6	7	9.5	
Walking at night until exhausted and resting thereafter	120°	1	2	2	2.5	3	
	110°	2	2	2.5	3	3.5	
	100°	3	3.5	3.5	4.5	5.5	

Survival times for walking out during the daytime are not available. Certainly the survival times will be much less than those indicated for either table.

For the man surviving in the desert there is consolation in the fact that these survival figures have been knocked screwy by men who had no knowledge that they could live a certain length of time under certain conditions and survived when scientists calculated their chances at zero.

as lassitude and weakness take over and you may not realize your need for water. The body loses its efficiency and the mind its ability to think clearly and there you go wandering all over the place. So don't conserve water, conserve sweat. You can stay in the pink for a good 48 hours with four quarts of water if you stay put . . . Conserve Sweat . . . Make Shade . . . and Stay Put.

MCAAS Yuma has designed its own desert survival kit for local use. Fabrication of the kit was prompted by the fact that a pilot was picked up suffering from moderate dehydration and heat exhaustion after being down in the local desert for only three hours.

The kit is simple and provides basic requirements for desert survival. It is packed in a canvas container identical to the canvas type pack which holds the PK-2 survival kit. The pack is international orange for identification purposes. The kit is a temporary replacement for the PK-2 kit for rotational units at MCAAS, Yuma and on their departure the kits are returned to the station for re-use.

The desert survival kit contains the following items:

12 cans of water and a church key. The water may get hot from the desert heat but keeping it under shade will cool it. Drink all you want when you want it—but don't waste it. Be careful to set the open can down so as not to spill it—sand really soaks up water. Small openings with the church key will be safer than large openings.

1 high visibility, high reflectivity fluorescent red cloth—High refractile colored cloth for identification and discovery. Spread it out. It can also be used for shading or draped for clothing and shade.

1 signal mirror—All should be familiar with its use.

1 compass—Strictly for bearings. Hope you will stay put until SAR arrives.

1 flashlight—In the event of a night ejection or crash and can be used as a signalling device.

6 pkgs matches—At night in the desert fires can be seen for miles.

Miscellaneous: chap stick, toilet tissue, Band-aids, 2 small battle dressings.

The kit contains no salt tablets; you can keep your salt level up by adding a little extra salt to your meals at night time as a part of your daily hydration routine. There is no snake bite kit either. Snakes are not a problem if you stay put.

Food is not important in short time desert survival as anticipated in the local area. As a matter of fact food, especially the highly concentrated foods, is detrimental. Eating and digestion require water to form urine to eliminate waste products. Your body then requires more water to maintain a state of adequate hydration. You can go a long time without food but your hours are numbered if you are without water. So—no food in the kits. Furthermore, it takes up valuable water space.

Communication devices and signals such as transceivers, beacons and smoke flares take up valuable water space. A perfectly good simple non-space occupying signalling device is the signal mirror. The sun shines hot and waxy all day, every day, and since water is the main survival item, all bulky signaling devices have been omitted from the kit.

From a distance, day flares are not as easily detected on a desert background as might be expected. The SAR team at Yuma is well-organized and efficient but it has flown directly over a pilot who not only used up his flares but had his parachute stretched out on the ground. The highly reflective fluorescent red material in the kit placed in the middle of an open parachute is much more eye-catching than the chute alone. And who can miss the beam from the little sun caused by the signal mirror so practice sending those SOS's with the mirror. Just spot the helicopter and with your free hand make with the dots and dashes. ●

CAPT J. C. Pinto, MC, USN, is a graduate of St. Joseph's College and Hahnemann Medical College, Philadelphia. He entered the naval service as a LTJG in 1942. After a year of duty aboard the USS BAINBRIDGE (DD 246), "an old four piper," he entered the School of Aviation Medicine at Pensacola and was designated a flight surgeon in 1945. He was ordered to his present duty station, MCAAS, Yuma, Arizona from the First Marine Aircraft Wing, Japan in 1959. Dr. Pinto is a private pilot with single, multi-engine and helicopter ratings.

MAYDAY for an ANGEL

ON a routine ASW flight with three other helos, an HSS-1 experienced engine failure of undetermined origin about a mile from the carrier. The pilot broadcast Mayday and turned the aircraft approximately 30 degrees to port. Contacting the water gently in a slight right skid, the helo rolled to starboard and sank within 15 to 30 seconds.

Here is a summary of the crew's escape and rescue:

Very little jolt was felt on impact with the water. The copilot shut off the mags and applied rotor brake. By this time, the cockpit was partly filled with water. The pilot released his lap belt and escaped through the open port hatch with his head just above the rising water. Pulling one toggle on his life vest seemed to provide all the buoyancy he needed to stay afloat.

The copilot, (occupying the right seat), first attempted an exit through the starboard hatch. As the aircraft continued to roll to starboard, the force of the inrushing water caused him to change direction. Propelled by the water and his own buoyancy, he easily followed the pilot out the port hatch although completely submerged. Reaching the surface, he inflated his life vest.

Alerted for the ditching, the sonar crewman, strapped securely in the left cabin seat, had covered his face with his arms. Realizing he couldn't get out against the water pouring in through the large hatch, he stayed in his seat until the cabin was filled; then he unstrapped. Just before reaching the hatch, he discovered he had failed to unplug the cords from his helmet. Rather than take valuable time to return to his seat to unplug the cords, he discarded his helmet.

As he tried to go under the safety strap across the hatch, his PR2 waist pack raft snagged and held him. When he felt for his survival knife, he found he had forgotten to transfer it from his other flight suit. A hasty attempt to unlatch the doorstrap was unsuccessful. As the aircraft continued to turn almost completely over, he floated free and swam to the surface.

By now the other three helicopters in the flight were on the scene. The first helo attempted a pickup but gave up because of hoist trouble and moved away. A second moved in, picking up the crewman and the copilot without difficulty. A motor whaleboat from the plane guard destroyer was close to the pilot as the third helo was in position with its sling lowered. The pilot waved the boat off and the helo made the hoist.

Rescue operations were conducted without mishap but not without difficulty. An S2F type aircraft had flown through the rescue area beneath one of the helicopters moving in for the rescue pickup and over another, barely missing it. "Failure on the part of a fixed wing aircraft and the destroyer's rescue boat to recognize the precedence of the first rescue helicopter on the scene caused apprehension on the part of the pilots of the rescue helicopters," the AAR states.

The pilot's and crewman's lack of helmets during the rescue left them vulnerable to head injuries while being hoisted. The pilot had removed his helmet while in the water in order to be able to hear his copilot better. Before being hoisted, he had emptied the water from the helmet but the waterlogged sponge liner was so heavy he had carried the helmet up under his arm instead of wearing it. The crewman's helmet had gone down with the aircraft.

Survival training was up-to-date. Two months before the accident, the squadron had conducted a timed ditching drill, according to the reporting flight surgeon. In addition, on routine flights in various situations, the pilot frequently made mental review of what he would do if faced with different emergencies. This may well have prepared him for the ditching and contributed to its smooth execution, the flight surgeon says. The copilot felt that his swimming and Dilbert Dunker training had benefited him in his escape from the aircraft. The crewman stated that his Dilbert Dunker training had prepared him for the impact and for the water rushing in at him.

The difference between an incident and an accident is often a matter of luck. But luck is a frail undependable thing and won't always let you come out . . .

MIGHTY LIKE A ROSE

AD-6 Loss of Oil

WINGMAN noticed lead aircraft streaming thin white smoke. Pilot then reported slowly dropping oil pressure and he reduced rpm to 1400. The wingman ducked through a hole in the stratus undercast, located a suitable field, then climbed back on top to direct the disabled aircraft. Pilot of lead aircraft jettisoned tanks in non-inhabited area and made successful wheels-up forced landing.

Investigation of oil tank revealed 1.5 gallons of oil remaining; aircraft had 26 gallons aboard at takeoff. Cause was low torque value assigned to the part which attached manifold drain line to front sump. Engine oil escaped when nut loosened, and eventually backed completely off.

Comment: Forced landing was well executed, minimizing damage to aircraft. Wingman's timely observation of loss-of-oil conditions, together with his expeditious assistance in finding suitable field, probably averted complete engine failure due to loss of oil.

A4D Gas Bath

PILOT on aerial fueling flight had disconnected from tanker and moved out to one side when fuel began to siphon from fueling nozzle. Fuel entered the engine intakes and then was ducted through air conditioning and pressurization system in the cockpit.

No more than three or four seconds elapsed until visibility in the cockpit was reduced to the point where no switches or instruments were visible. During the time when the pilot had no flight reference the A4D was seen to go through several erratic gyrations. To clear the cockpit he went to ram air and conditions returned to normal in about one minute. At that time he observed that the flow of fuel had stopped.

Later inspection of the fuel probe revealed no discrepancies; however, squadron procedures were revised to include a functional check of the fueling probe at each 30 hour inspection.

Comment: Due to the nature of this unexpected hazard, continued need for pilot blindfold cockpit checks is evident. Had this occurred during low altitude aerial fueling the consequences could have been a serious accident, thus, the squadron proposed that all its low altitude aerial fueling be made with ram air selected.

FJ-4 Preflight Runaround

Because of a change in flight scheduling the pilot involved was scratched from an instrument flight plan in which he was engrossed to hurriedly prepare for an aerial refueling mission. The briefing was adequate for the planned flight, but rushed. There were three aircraft in the flight, an A4D tanker and two FJ-4s for plug-in work. Weather conditions required an IFR flight plan.

The three pilots preflighted and manned their assigned aircraft, waiting for ATC clearance prior to starting engines. After starting the FJ-4 the pilot in question had to down his aircraft for a hydraulic leak. He immediately proceeded to the squadron space and instructed his plane captain to get the yellow sheet. The pilot made a hurried preflight and had strapped himself in by the time the plane captain returned with the yellow sheet. Since the pilot had signaled for an NC-5, the plane captain had barely enough time to remove the tie-

downs and to quickly walk around the aircraft to see that all access doors were closed.

Upon starting the engine the pilot noticed a loud bang but he elected not to shut down and investigate since the instruments were normal during runup and takeoff. However, he was unable to effect an expeditious rendezvous because of lack of thrust.

The aerial refueling exercise was completed without further incident but after the A4D had detached the FJ-4 pilot heard three or four loud noises and requested the other FJ-4 pilot to expedite a return to base. During penetration several more very loud banging noises were heard.

As a consequence of these noises the pilot elected to leave his rpm at 93 percent but his final approach was high and fast even though touchdown was 1000 feet from the approach end of the runway. Owing to excessive speed and a 10-knot crosswind component, an attempt at aerodynamic braking only resulted in the aircraft lifting off the runway and loss of control. He added 100 percent but now with 3000 feet remaining a waveoff was necessary.

Although the second approach was fast at the 180, the remainder of the approach and touchdown was normal. The pilot taxied his plane to the line and upon deplaning discovered that the duct cover was lodged in the intake, displacing the starter generator housing.

HUP Thrown for a Loss

AFTER a normal engine start, the rotor blades were engaged. A 9/16th inch wrench had been left on the forward rotor head and upon rotor engagement this wrench fell to the ground. The flagman picked up the wrench and intended to throw it back to the plane captain. However, his aim was such that the wrench went into the forward rotor system—CLANG BANG!

Comment: Aircraft damage was a dent plus a ½ inch hole in one blade. The wrench, which was not damaged, was found about 50 feet to the left of the aircraft. This incident could have resulted in injury to ground personnel had the wrench been thrown by the blades in another direction.

T-34—Gee Whiz

THE instructor was giving the student an unusual attitude by pulling up from a dive (nose approximately 30 degrees below the horizon, 160 knots). As the nose started rising, the aircraft was rolled to an inverted nose-high attitude.

From this inverted position, a normal power-on, full aileron recovery was made. After the maneuver 9 G's were seen on the accelerometer and the aircraft then returned home. Both wings were slightly wrinkled along station 45 with popped rivets aft of the main spar.

Comment: A rolling pull up imposes additional stress on the aircraft. The maximum permissible acceleration (G-units) is only about two-thirds of the maximum permissible acceleration for a normal pull out.

HRS-3 Helo Mountain Flying

WHILE on an authorized flight in mountainous terrain, the pilot was descending from 2200′ at 300 feet per minute. He failed to see a span of three high-tension wires spread across a canyon until it was too late to avoid contact. In an attempt to avoid the wires, the pilot pulled to a nose-high attitude. After hitting them an immediate landing was made on a nearby road and the rotors shut down.

Damage included right clamshell door slightly bent and burned; right windshield scratched and upper right windshield broken, as well as all rotor blade leading edges slightly scratched.

The span of the wires was 1500 feet and at the center of the canyon they were 300 feet above the ground.

Comment: Pilots must exercise extreme vigilance for power cables whenever flying in valleys.

F8U Prestart Checklist

AS the aircraft taxied to a position behind the port catapult, squadron personnel proceeded to remove the wing fold jury struts. Immediately upon removing the port wing jury strut, the wing commenced to spread. The starboard strut could not be freed, and it was at this time that the starboard wing fold rib assembly attachment lug was observed to be cracked.

Later inspection revealed the port rib assembly also was cracked.

The pilot had not been given the wing spread signal nor had he actuated the wing fold lever. However, the moment he noticed the port wing spreading he checked the wing fold lever and observed that it was in the spread position.

Accident Board's comment: Maintenance personnel, who worked on the wing fold lever assembly, failed to return the lever to correct position; plane captain failed to notice improper position of wing fold lever; a correct prestart cockpit check by pilot would have shown lever in wing spread position. ●

BAILOUT from a

Our altitude was less than 2500 feet and smoke was rapidly filling the cockpit, when the pilot said we were going to bail out. I took off my gloves and waited with my hand on the canopy handle.

Smoke was now so thick that I couldn't see the pilot and I thought—"I have got to go or I won't get out." It was at this time that I heard him pop his canopy, so I popped mine. I jumped straight up with my right foot coming down in the middle of the seat and my left foot in front of it. As I turned, or was flipped around facing the back, I saw one of the other ECM operators going under the tail.

I think the reason that I jumped up was because I wanted some air, but I don't know for sure. I felt good and it looked like I could just step over the side, which I tried to do, but could only get to the edge. Tried to crawl out but couldn't and was getting ready to panic, when I said to myself, "Stop, you have got time so don't worry. One thing at a time and right now you have got to get out of here. . . . Do it like you are supposed to." I then got both feet on my seat and hands under the edge of the side. There was no force on me—just like I dropped into a vacuum—so I leaped and think I got my head out. I was at the rear of the cabin and my hands were on the side of the canopy . . . went perpendicular to the wind and couldn't get out so I realized I should go with the wind. Had a good hold on the canopy so I put everything I had into my arms and legs to get into the air stream. I put my feet on the front inside seat and pulling or pushing with my arms and pushing with my feet, I leaped out.

As soon as I hit the air stream my hat went off and I grabbed it with my right hand. I put my hat back on and pulled the rip-cord. I felt the parachute slowly streaming out behind me and opening very slowly above me. I was spinning around and reached up to see what was wrong. The shroud lines were untwisting and I made one more turn and stopped. I grabbed hold of the lines and eased myself a little more back in the sling and, using both hands, reseated myself more firmly. About this time I saw two chutes in front of me.

The next thing to do was to unsnap. I felt like I would fall out if I unsnapped but I told myself I wouldn't because it should be just like the drill we had last year on the carrier. I unsnapped my leg straps and didn't fall out so I unsnapped my chest strap—still didn't fall out. I thought, "This is just the way it should work." Then I thought, "I forgot my life raft." I wished then that I had opened one before to see how you do it. I had had the urge but never did because I was afraid I might not get it together again. A parachute rigger told me once not to worry about opening it because it is very easy. When I got the container I pushed both sides and it fell apart. I pulled out the life raft which almost fell out. I told myself, "That is all for now so sit back and rest and be ready to raise your arms when you hit the water." I noticed something like a small white chute tied to my life raft with a line. (Later I found out this was the sea anchor.) I looked at the other two guys in the chutes and looked for this small white chute tied to a line to see if they were ready. I wondered how they were doing. I thought, "They are a couple of good kids so I sure hope they make it." I thought the pilot was above and behind me but never saw him. (Both he and one of the ECM operators were lost.)

About this time I hit the water on a crest and went down in a trough. I raised my arms and it seemed like I went for a flip and into the water. As I was going into the water I thought of a conversation a few days before with my division officer. He had said that you wouldn't know which way was up

Queen

and I realized I didn't. I started looking for my CO_2 cylinder toggles on my mae west and pulled the right one and then the left one. About this time I wanted a breath of air. I thought of an article I had read a while back and remembered I had gotten the impression from it that you sure could drink a lot of salt water before you drown so I took a few gulps.

About that time I saw the surface. I made a lunge up and took a deep breath of salt water because my hard hat had flipped over my face and it was full of water. So I took off my hat and put it back on just before I climbed in the raft. I started looking for my life raft on my right side and it wasn't there. I found the snap and noticed it was wrapped around me. It was a real relief to see it; I pulled the CO_2 job and it inflated. Then I wondered where you were supposed to get in it and it seemed like I remembered you were supposed to get in from the front end. I said "To heck with it, the back end is closer," so I climbed in and only got one or two inches of water in it. About two swells later it was almost full. I didn't seem to care until then. I wished I had something to bail the water out with; I thought of my hard hat and I was glad I still had it. I bailed the water out and snapped the snaps on the front cover of the raft.

I noticed a parachute next to the raft and tried to grab it but couldn't hold on to it—thought it would help them see me better. I pulled the clear visor down on my hard hat and started waving it so they would see me. I kept doing this until the helicopter came. I unhooked the life raft strap from my mae west and the helicopter copilot gave me the sign to jump in the water. I did and they pulled me up. My watch had stopped at 1046; I think it stopped when I went into the water for the pick-up. ●

ICY SLIDE OUT!

ANYMOUSE

An hour after takeoff we were sitting in our A3D at 34-thousand feet watching the sun go down behind the Northern Rockies. It was cold at our altitude, of course, but it was cold on the ground too—the brittle February cold of Montana and if we could have seen through the layer of clag below us there would have only been a white, wrinkled sheet of snow covered mountains to see.

Using this particular time to begin the story is appropriate because about then the port fuel indicator went 400 pounds low. As the power lever was adjusted the aircraft began to vibrate, followed by a loud grinding noise. The gunner/navigator reported fire in the port engine and the pilot secured that one immediately.

Following this flurry of action a somewhat routine sequence took place: We declared an emergency, put IFF to emergency and began to be vectored toward the nearest suitable field which happened to be 40 slant range miles away. It was an Air Force Base at an elevation of 3500 feet with 11,500 feet of runway. Communications were good but as we settled into the clouds on our letdown, the realities of the surface conditions began to sink in.

The ceiling was 900 feet obscured with two miles visibility in light precipitation, one of those setups where you aren't truly visual until several hundred feet below the advertised ceiling. Surface wind was 12 knots and a little later on it became evident this would be a 40-degree crosswind from the right.

Coming down the glide slope our weight was about 46-thousand pounds and touchdown was at 145 knots. Once on the runway our problem began to take shape. Snow patches on the runway gave intermittent braking effect and that light precipitation was falling on a surface which had a temperature of 5 degrees F., making the whole deal an icy slide. It seemed an eternity until the runway lights quit "zipping" by and slowed to a more reasonable rate of movement.

But then the crosswind took over and our big truck started arcing for the right side of the runway. Struggling with nose wheel steering did no good and it was just a matter of time before we were going to be axle deep in mud. Visions of a buckled nose strut and the paperwork of an AAR dominated the cockpit.

Airframe vibrations told us we were off the hard surface but nothing gave way—we just might get away with it. The airplane finally stopped in a normal level attitude. Glad to be on solid ground, but afraid to hope our luck could be so good, we jumped down out of the cockpit to have a look. Boy, was that ground solid—instead of soft mud it was frozen hard enough to support the runout without damage!

Pax Souvenir

It has happened before; it happened last night, and it'll happen again if you aren't careful.

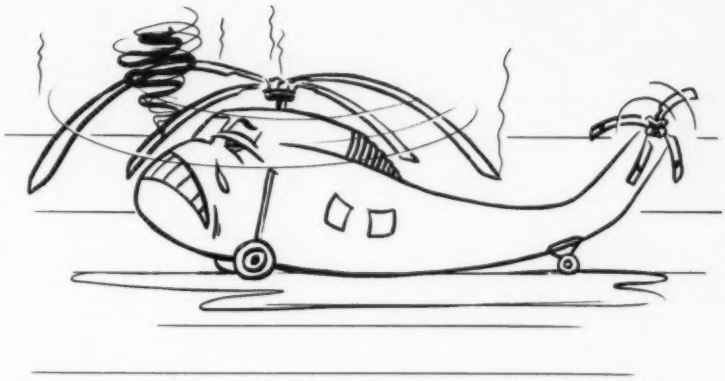
After discharging the rear seat passenger from my "T" bird (that's Air Force for TV-2), I directed the lineman to secure the rear cockpit. One night flight hour later, in the landing pattern, I found it difficult to retard the throttle past 80 percent rpm.

The approach included a long

final and with much tugging on the throttle the power finally came back to 65 percent rpm. After touchdown both hands were needed to hold the throttle back. After heavy steady braking (thank goodness for a dry runway) the bird stopped after 8000 feet of roll.

You have probably guessed the cause—the rear seat oxygen hose which was clipped to the left canopy rail, fell and lodged between the throttle and the flap handle guard.

If the runway had been wet and rainy as predicted, I wonder what would have happened.



Cockpit Straps Again

The HUS was being started as one of a 16-plane VIP commitment. Time was of the essence and all hands were eager to start their aircraft in a most expeditious manner so as not to delay the flight.

To this end I started the aircraft immediately after entering the pilot's seat and without strapping in. After starting and before engaging the rotor, I turned the controls over to the copilot and started strapping in.

At this point, as is common with HUS aircraft, I found the seat belt on the left side hanging down under the collective into the cabin section. It is extremely difficult, if not impossible, to retrieve the belt without aid from below in the cabin.

After a few unsuccessful attempts to grasp the belt, I finally got a firm grip on it and gave a mighty heave upward. The belt snagged the collective with sufficient force at this point to pull it and the copilot's hand upward causing an inadvertent throttle increase which caused an engine overspeed to 3500 rpm! I saw this on the tach.

The engine cooling fan somehow did not come unglued and we of course shut down—finished for the day, since the engine had to be changed.

Our squadron now stresses two solutions to this inherent HUS problem. First, a bungee cord with a wire hook on the end, can be incorporated on each side of the cockpit so as to hold the belts by the side of the seats when not in use. In the absence of these hooks, the plane captain should be instructed to lay the belts across the seats prior to each hop. The pilots will then be able to retain them in their lap until ready to hook up.

"Construments"

On a night cross-country I commenced descending through some thin patchy cirrus at 32-thousand. Another solid layer was below with tops at 8500 to 9000 feet: Base of this layer was 3500 feet.

I was 15 miles from initial approach fix with my wingman about five miles astern in radar trail. There was no horizon and no moon though there was a faint definition between sky and clouds. I was flying half VFR and half on instruments which made an ideal situation for vertigo.

Center gave us a frequency and clearance to approach control so I started to dial it in. When I finished and glanced outside it seemed I was in a steep bank to the right (after some later reflection I believe it was actually a left bank). I tried to correct my attitude but could not seem to get my scan going.

Becoming completely disoriented, I finally got on the gages and leveled at 22-thousand. I was pretty shaken; however, when due to precession the attitude gyro indicated a 15-degree bank to the right while the turn needle indicated ½ standard rate turn to the left. This shook my confidence in the instruments but I continued to fly them. Even when they indicated level flight I felt like I was in a nose low spiral.

By this time I had advised approach control of my vertigo and was being vectored to the field. Just as I was beginning to regain control of myself and confidence in the instruments, I entered the overcast. As I had left my fuselage light on the glare was blinding. I looked toward the switch when turning it off and got disoriented again but I learned my lesson and believe the instruments. The rest of the descent and landing was uneventful.

That 10-thousand feet I lost when I didn't know which way was up could have been fatal if I had started my gyrations lower. ●

Have a problem, or a question?

Send it to

headmouse

he'll do his best to help.

U.S. Naval Aviation Safety Center, Norfolk 11, Virginia.

Chute Line

Dear Headmouse,

Nylon seems to be relatively the lightest, strongest, hazard-resistant material we have for parachutes. It does the job extremely well in the air; however, it sinks in water and is a very poor insulator.

Is it not possible to impregnate the nylon parachute canopy, risers and shroudlines with a very light bubbly epoxy or resin to make them buoyant? The parachute would then float on the surface of the water and would not drag the survivor down if he were entangled in it. It would also be a good visual target on SAR. This substance might also improve the nylon's insulating qualities.

I see two drawbacks. Fishing with a buoyant line is difficult so I suggest leaving two shroudlines unimpregnated. If the material is nonporous, one might suffocate in it.

G. H. BOCKWINKEL, LTJG

► We have forwarded your letter to the Naval Parachute Facility as a matter under their cognizance. Your basic idea appears to have the following disadvantages:

a. Added bulk creates problems in the weight and space field (i.e., packaging of parachute; small cockpit accommodations in present aircraft).

b. The porosity of the parachute fabric would be eliminated. The specially woven, porous material for parachutes provides strength and porosity necessary for a safe descent.

c. Elasticity would be affected. The standard parachutes used in the Navy are designed to withstand an opening shock of approximately 8,000 pounds. The cloth must be capable of withstanding great amounts of stress and must possess elasticity.

The parachute has proven its reliability as a life-saving device. Its post-descent uses for survival are of secondary importance.

Although your proposal may not be readily adaptable, ideas and interest such as you have shown often lead to improved equipment in the field of aviation survival.

Very resp'y

Headmouse

Talking Tacan

Dear Headmouse:

Perhaps you could settle once and for all an interesting point which has been kicked around the readyroom both pro and con:

The point in question is whether or not it is possible to receive voice communication on the Tacan receiver.

I contend that there is no way possible in which voice communication can be received on Tacan similar to the manner in which a pilot can receive voice on the omni receiver. Most of the pilots believe as I do but there are some who are not convinced and who still think it is possible to receive voice on Tacan.

Recently while flying an A4D on an IFR flight plan ATC asked me to monitor an omni station for the weather which I had requested. I patiently explained that I was Tacan only. Imagine my amazement when they replied that this was fine since there was a VORTAC station there. If I am right (and I think I am) this indicates to me that all ATC or FAA controllers are not aware that voice reception on Tacan receivers is not possible. Perhaps a little education of ATC controllers is necessary along this line.

LT, USN

► Rest easy, Lieutenant and attention all ATC controllers. If you made any bets to back up your convictions you can collect. Our electronics experts say that it is impossible to receive voice transmission on our presently installed Tacan receivers. For a refresher on Tacan refer to the May '61 APPROACH which has a very informative article.

Very resp'y,

Headmouse

On a recent field trip Headmouse was surprised to discover that many people do not realize that informal letters to Analysts (or anyone else you may know here at the Center) are encouraged. Whether it be a solution or a problem, give us a try—maybe we can help someone. Note: *This is not to be construed or used as a bypass for matters which obviously require official correspondence and action.*

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TRACER SAVE!

For an hour prior to manning aircraft, the flight leader briefed the members of the early morning launch from the carrier. Low altitude ejection was the "emergency brief for the day." He read excerpts from the pilot's pocketbook emergency handbook and the flight manual and a thorough discussion followed...

When the flight leader's F3H flamed out on the ensuing flight, he was forced to put his own briefing into practice.

It became evident that a relight was not imminent and my next recourse was to ditch or eject. I placed the throttle in CUT-OFF and noted altitude as 1000 feet and airspeed 180 knots. The water was rough with prominent whitecaps. With wings level and a level attitude, I elected to eject.

My legs were forward with my feet resting on the rudder pedals as I pulled the face curtain smartly towards my chest. The ensuing departure from the cockpit was prompt and efficiently programmed. I saw the blast flame of the internal cartridges as the seat fired. I felt the seat separate from me. The personnel parachute deployed allowing me to see the aircraft plunge into the water, wings-level in a slight nose-down attitude. The Martin-Baker seat appeared to be in line with me and impact spot of the aircraft. I felt no tumbling sensation and feel certain that I remained in an erect sitting position from the initiation of the ejection until the personnel parachute fully deployed. I was supported by a fully deployed parachute at about 800 feet.

With sufficient time to prepare for a water landing, I then removed my oxygen mask with both thumbs on the Sierra fittings. Remembering how I had underestimated altitude over water the last time I ejected, I grasped the risers and put my feet together. I breathed normally and submerged about six feet on entry in the water. The parachute as it reacted to the wind nursed me to the surface. I promptly released the rocket jet fasteners and pulled both Mk3C life preserver toggles simultaneously. Inflation was normal.

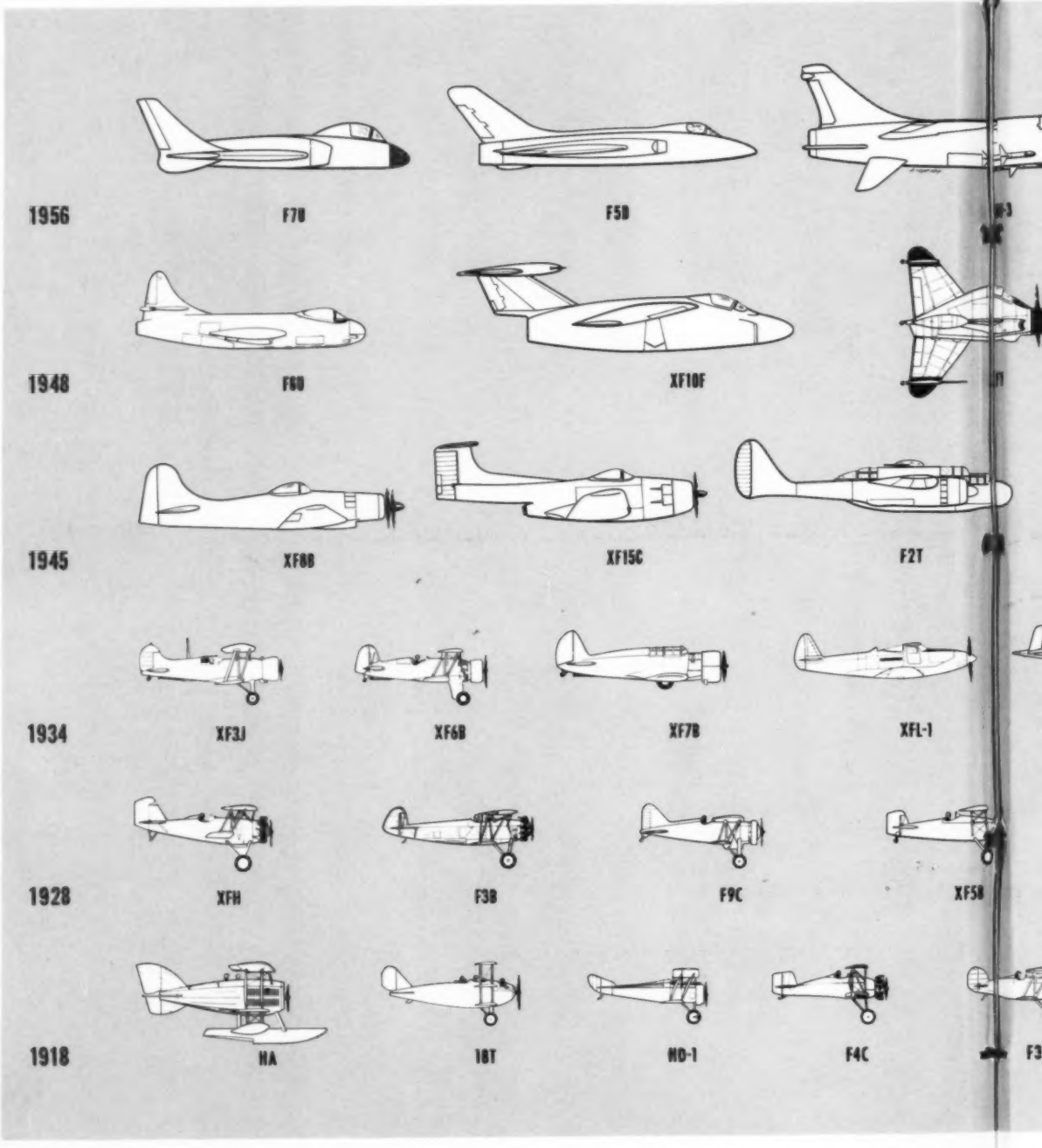
Floating in the warm water, I removed my flight gloves and helmet immediately. The parachute was partially submerged in the area I was floating in so I relaxed to avoid entanglement. I then released the right fastener on the seat pack and removed the life raft. I realized later that I should have released the left fastener first so that the para-raft would swing to my right where I could reach it more easily. The raft inflated normally and after my second attempt to enter it, I was comfortably aboard. At this time I noticed two F3H aircraft circling me at an altitude of about 200 feet. I waved my arms to signify that I was in good shape. I drew my .38 caliber pistol and fired five tracer rounds straight up in the air to show the ship my position. I reloaded my pistol and fired two more rounds at a slow interval.

Then I pulled my seat pack aboard as I figured the carrier's helicopter or plane guard would be on the way to effect rescue. As I was breaking into my seat pack to locate the hand radio or smoke flare, I heard a HUP approaching from behind. The pilot hovered about 30 yards to my rear. I released the left seat pack fastener, abandoned my raft, and swam towards the helicopter which was trailing the sling slowly towards me. As I approached the sling, the helicopter hovered and I put on the horse collar above my life preserver and under my armpits. I then grasped the swivel and signaled the hoist operator to pick me up.

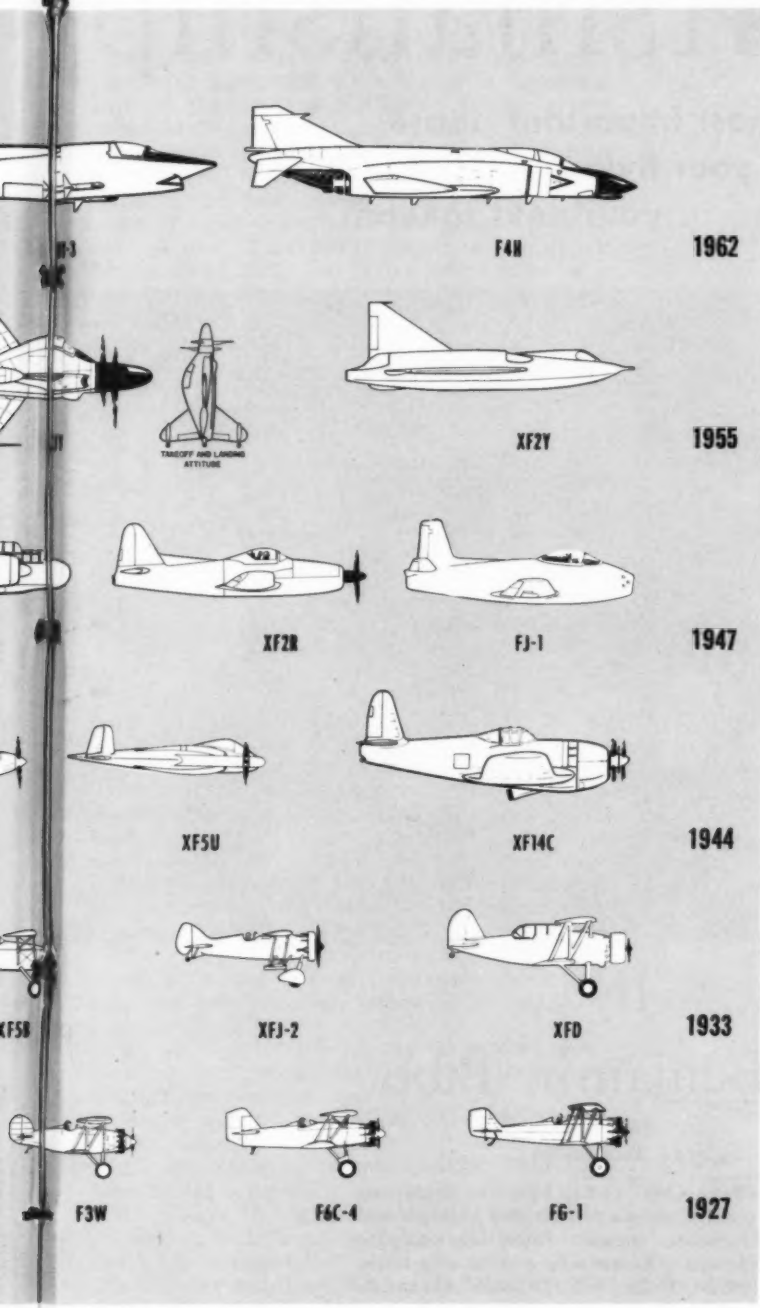
The pickup was smooth. When I reached the top of the hoist I put my feet and legs up on the after deck of the cabin and told the crewman to shut the hatch. He closed it promptly and locked it. I then slid aft onto the deck, removed the sling, got up and took a seat. After buckling the lap belt, I awaited return to the carrier.

I was back on the flight deck about eight minutes after the flameout. ●

DEVELOPMENT OF U.S. NAVY F



VY FIGHTER AIRCRAFT - PART II



Though this collection of drawings shows some fighters which have been placed in squadron service, the main interest may be in certain experimental models which represent a radical concept in VF operations.

When all these "concept" airplanes are added together, it is evident the Navy has explored in all directions to promote combat capabilities: There was Convair's delta wing XF2Y seaplane jet; two turbo-prop vertical takeoff (VTO) fighters (XFV-1 "Pogo" not shown), and the XF10F with variable wings (straight for slow flight and swept back for high speed). Vought's XF5U was referred to as "The Pancake" from its disk-like wing plan when seen from top or bottom. Ryan tested turbo-prop power for possible VF use in their XF2R.

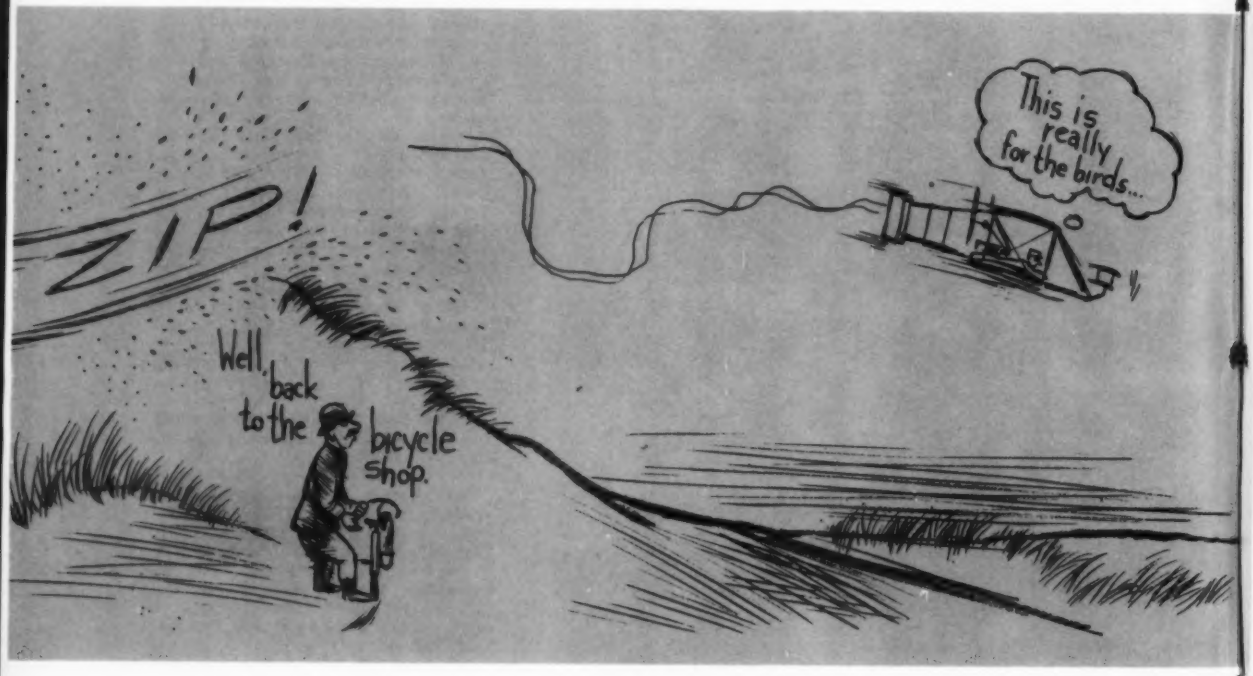
Other experimental efforts were less dramatic but were unusual when introduced. Two airplanes in this category came in the closing months of WWII. They were the XF14C and the big (17,500 pounds) XF8B. Both mounted contra-rotating props, unique for proposed Navy combat types.

In the early 30's advanced techniques were scattered around in individual aircraft. Boeing put them all together in the XF7B and produced an all-metal, cantilever low-wing fighter, complete with retractable landing gear. Speed-wise it was not revolutionary enough to get a contract but it did forecast the future.

One of the XF7B's features was an enclosed cockpit and apparently this was just too much for the cockpit clan and they tried to turn the clock backward. After initial tests the XF7B was returned to the factory for modification and it is said that one requested change was removal of the sliding canopy, turning it into an open cockpit machine. ●

Takeoffsmanship

The most important phase of your flying may be your next takeoff!



by

Lt. Benjamin Bibb

RATCC,

NAS, Jacksonville

In "Takeoffsmanship" LT Ben Bibb has again contrived to present a serious subject in a highly entertaining and humorous manner. Those who enjoy the Bibb special brand of humor may wish to refer to the June '61 APPROACH for "I Can't Look," his article on landing techniques.

IT is true that sometimes I have to cover my horrified eyes to shut out the sight of unbelievable landings, but really there is a bit more to this flying game than just replacing the airplane in its gravity-bound parking place. Three different, *very* different phases occur during each flight—(each successful flight, that is) a takeoff, a thrashing through the air to a destination (either predetermined or unplanned) and a landing. A simple proclamation of which phase is the most important is impossible, for the importance of the phase depends on the time element. *The most important phase of flying is that one which you are going to attempt next.* Therefore I submit to you, driver of the metal bird, that if you are sitting in a readyroom reading this, the most important phase in flying is your next takeoff!

The Wright Brothers, bless them for pioneering our livelihood, have been widely acclaimed for achieving the first airplane flight. This credit is actually too broad. They should be credited with the first successful airplane takeoff. Flight followed the takeoff quite naturally, and the subsequent landing, whether they realized it or not, was inevitably approaching.

In all my years in and around aviation I have heard countless boasts by pilots of their skill in landing aircraft, either a certain type or all aircraft in general. I have also heard endless stories of skill concerning accurate navigation, ability to hold altitudes, flying good attitude and airspeed, avoiding icing and turbulence and even maintaining VFR. Yet, during these same years, I have never once heard a pilot brag of his skill in taking off an aircraft. And never forget that flights and landings are merely the end results of takeoffs, for if the aircraft becomes airborne it will, as surely as "R" follows "AA", fly until it comes back to earth.

A takeoff begins with a taxiing, thus:

"Navy Glump Ground Control, this is Navy one two three four for immediate taxi and ATC clearance to meet ETD, over."

"Navy one two three four, cleared to runway niner, wind east one zero, altimeter three zero zero two, time one four. Stand by to copy ATC clearance, over."

"Er, uh, this is Navy one two three four, disregard my taxi request, hold my ATC clearance. Request line crewman, over."

"Roger one two three four. Are you having trouble, over?"

"Er, uh, negative, Ground Control. Still tied down by one wing, that's all. Out."

Moral—eye the apparatus before you zipper yourself up in it, for as Confucius says, "One look worth ten thousand pictures."

It is a very real thing that taxi accidents are the most unforgivable kind. A cloud of black smoke

replete with gutteral noises forms over the skipper's desk each time one is reported to him. Some Captains have been known to inflict more abstract damage to the offending pilot than was suffered concretely by the aircraft. And, in their bemusement, to themselves, what with noise vibration and pressure wrinkles.

Most taxi accidents are PICs (Pilot Induced Crunches). The taxi signalman can be blamed at least partially in some cases, if you are clever enough. Only a miserly percent are caused by material failure. It takes a wealth of natural talent or a second of inattention to have a taxi accident, so with such staggering odds against having one we won't worry about it. Will we? After all, the skipper will begin acting civilly again after a couple of fitness reports.

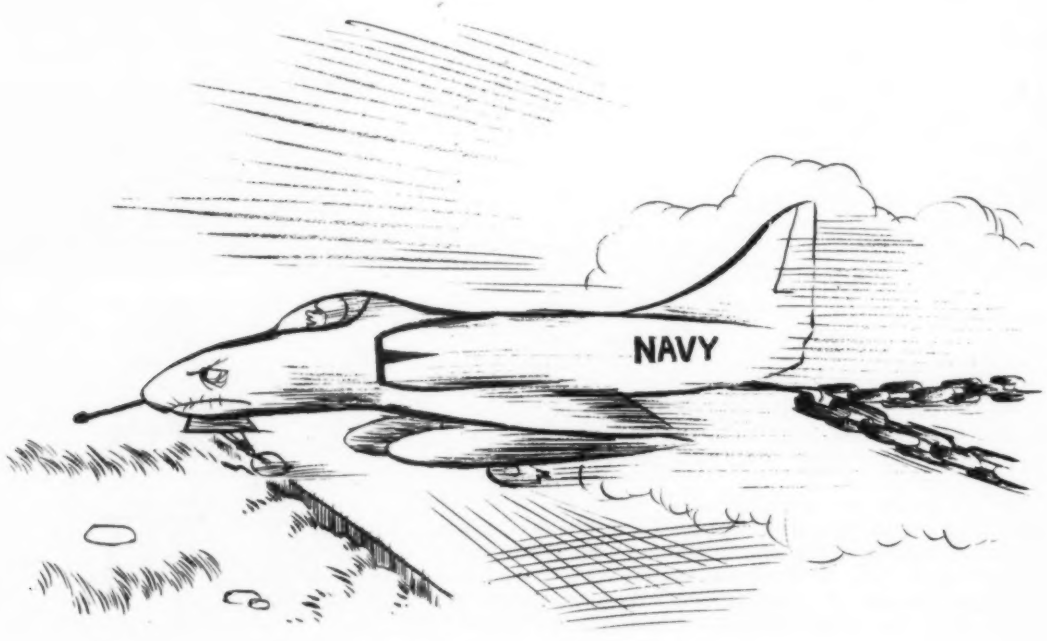
Next comes the takeoff itself, that wonderful moment when the machine's weight no longer prosaically rests on wheels which are rolling along on safe, sensible Mother Earth, but is suddenly borne by a *thing* called aerodynamics. Aerodynamics may be defined as a magical thing that keeps airplanes in the air so long as they are moving generally forward in direction. This is similar to bicyclodynamics, which magically keeps a

bicycle erect as long as it is moving generally forward. Do not confuse aerodynamics with General Dynamics, which is a magical thing that makes rich naval aviators richer as long as the market is moving generally upward. In aerodynamics, stoppage or considerable slowage of the forward motion will result in much discomfiture to the pilot and substantial alarm to the next-of-kin. Plus groaning earth and crying metal.

One of the most superfluous transmissions ever heard in a control tower was made recently by a young jet jockey. He roared down the runway, started to lift, lost power, braked until he blew both tires, then with laudable presence of mind dropped his hook and picked up the overrun arresting gear. His monster came to a stop in a great cloud of dust and smoke in the overrun, untidily trailing fathoms and fathoms of anchor chain. As crash trucks and ambulances screaming with anxiety converged on him he keyed his microphone. "Tower, this is four three two," he squeaked. "I aborted takeoff. Over?"

I now ask you, Sir Leftalot of the Blue, to answer honestly as to whether you have ever planned a flight in the following manner. You are going to NAS Destination. You visit Flight Planning select your route from the preferential route listing, check the weather and upper winds closely, make out your preflight log as accurately as possible, study the approach plates for Destination carefully and check the Notams. You file your flight plan. Then, in a great hurry to get cracking you rush out, leap astride your steed and clap spurs to it, ready to go—without having thought of or planned in any manner your takeoff, including even learning the duty runway until you contacted the tower. Before flight you considered the flight itself very carefully. During the flight you will review the approach and landing coming up. But, you confident rascal, you never at all seriously thought about your takeoff! Yet, a review of four randomly selected copies of "Weekly Summary of Aircraft Accidents" showed that nearly 20 percent of the reported accidents occurred while in the process of takeoffs.

Let us look at another for-instance. Think of how often you, or other pilots, check out a local flight to practice landings. How often do you hear of anyone going out to practice takeoffs? In shooting landing practice, the takeoff is much too often merely a necessary and annoying method of repositioning the airplane in space so as to practice another landing. But if nearly one in five of the aircraft accidents during a given period were takeoff mishaps, and especially considering the usual time involved in and thought given to takeoffs, your next one deserves some conscious and deliberate planning, don't you think?



Reflect on this remark from one pilot to another as they walk toward a trusty old Beechcraft on the flight line. "I haven't flown a *Beech* in four years, Joe, and I gotta have flight time. So, you make the landings and I'll make the takeoffs."

Yessiree, all you have to do is point the old *Beech* approximately down the runway, step on the go button and relax. She will take off instinctively. So, as your *Beech* thunders (sic) down the runway you get a slight sorta-like-trim-tab left drift.

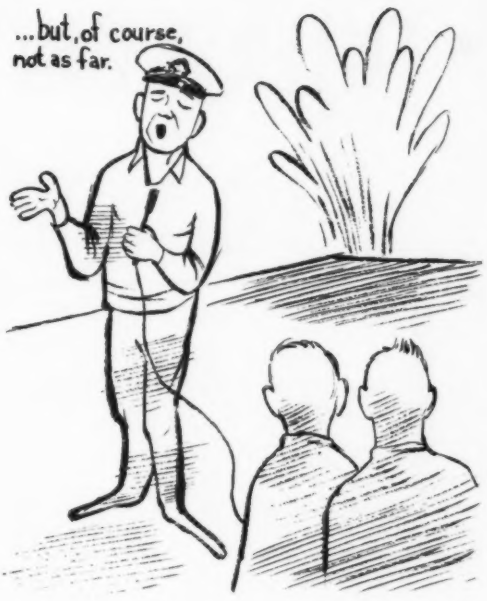
Hang just a tiny bit of right rudder/brake on . . . a wee bit of forward yoke to hold her on. Oops, too much brake . . . veering to the right now . . . How did that left wing get lifted? @#*#&$¢%!! Now we're heading for the parking line . . . Honk off the throttle . . . Left rudder and brake!

Great Scott! Now we're rolling diagonally across the runway . . . Probably will hit GCA . . . Give her full bore and horse it off . . . We're flying, but just barely . . . Might even miss the fuel farm at this rate.

Finally you pick up a few knots and stagger away from the field. Yessiree, you can't get in trouble with the good 'ole *Beech*.

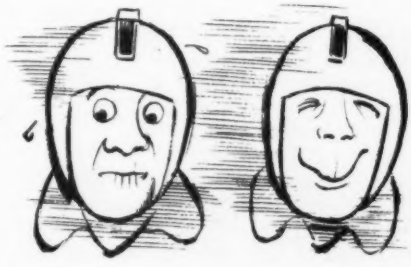
While deployed a few short years ago, one of our CVAs was given the opportunity to take aboard guests and stage an airshow for them. Demonstrations of cat shots, formation flyovers and other aeronautical jazz were to be followed by bombing and strafing a towed spar. As part of this demonstration two ADs were to make deck-run launches with heavy bomb loads to show off their capacity. The assistant air boss, in Pri-Fly, was announcing the show on the 5MC public address system for the benefit of the guests. CAG was flying the lead *Aydee*, and he lumbered down the deck on schedule. As he cleared the flight deck he began to settle, but kept the machine straight and level until he gained flying speed and gradually began to climb. The impersonal voice on the 5MC had described the AD and its load during this time. The second plane started its run. It in turn came to the end of the flight deck and started to settle. The pilot rotated the nose just a lil bit, and that was that. The *Aydee* settled more, he rotated more. Since the announcer could not see that far forward from his position, he continued his narrative unperturbed. "This airplane can carry a larger bomb load than did the B-17 in World War Two," he stated. Like punctuation, the *Aydee* hit the water just at the end of his sentence—SPLASH! "But, of course, not as far," he explained!

The point of this dissertation is that if some vital organ in your bird comes unstuck during takeoff, then you have a problem. Grabbing leather and yelling for help will not solve it, either. A little pre-takeoff planning and reviewing could very possibly help considerably. However, knowing what to do and doing it with no lost motion is a better safety factor than trying to check the handbook at this time. The takeoff accidents caused by inattention and unknowing overconfidence are the ones that are embarrassing, unforgivable, and in some cases, extremely fatal.



The manager of the O-Club is concerned about this, for with business like it is he cannot afford to lose a single customer. The Public Works Officer is concerned because unscheduled runway damage bites into his appropriations. Even your wife is concerned because she hates to prepare dinner and then have you not show up.

And I am concerned, because such an accident *could* be *most* serious. After all, *I* might be riding with you! ●



ENTER RIGHTLY HOLD TIGHTLY

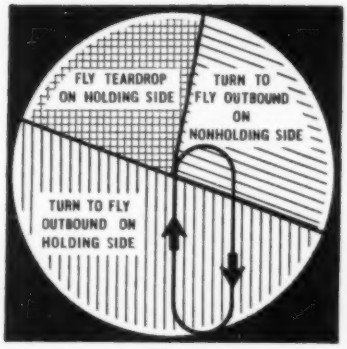


Fig. 1

. . . meanwhile out at the racetrack!

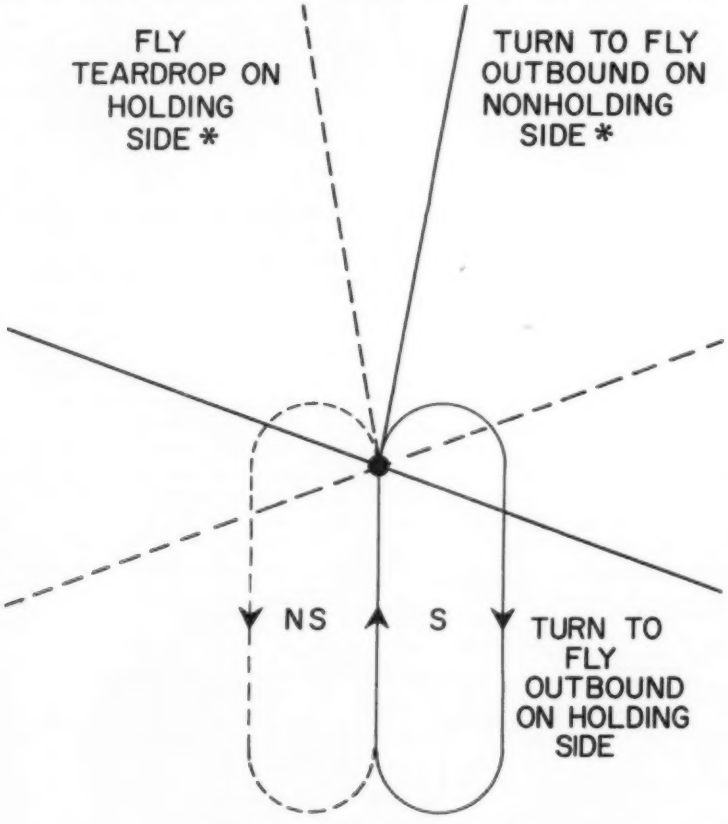

FLY TEARDROP ON HOLDING SIDE *
TURN TO FLY OUTBOUND ON NONHOLDING SIDE *
NS
S
TURN TO FLY OUTBOUND ON HOLDING SIDE
_____NONSTANDARD ____ STANDARD
*REVERSE FOR NONSTANDARD HOLDING.

Fig. 2

The year 1962 ushered in a new entry to holding and holding procedure. Effective 11 January 1962, the new pilot procedures provided for the most efficient use of airspace and minimized the impact of holding maneuvers on the holding aircraft itself and all air operations in close proximity.

The ultimate entry to and flight within a holding pattern area should maneuver the aircraft to intercept the inbound course to the holding fix for satisfactory on-course alignment prior to arrival at the fix.

Parts of the new procedures are of a general nature and can be classified as general instructions. There are three basic changes—methods of entry are now specified based on angle of interception, including a teardrop pattern; speeds, altitudes, and leg timing are changed; and for the first time guidelines are given for wind factor correction.

The following airspeeds are maximum indicated, but you are expected to hold at or less than those specified when practicable:

Propeller-driven

*MHA Through
14,000 feet . . . . . 170K IAS
Above 14,000 feet . . . 175K IAS

Military Turbojet

Subsonic	230K IAS
Supersonic (except F105 and B58)	265K IAS
F105 and B58	310K IAS

*Minimum Holding Altitude

Holding Pattern Flight Path

●When holding at or below 14,000, the outbound heading will be flown for not more than one minute (no wind).

● When holding above 14,000 feet, the outbound heading will be flown for not more than one and one-half minutes (no wind).

● When instructions to hold have been received, the aircraft is considered to be in the holding pattern at the time of arrival over the fix. Therefore, you should reduce to holding airspeed within three minutes prior to your estimated time of arrival at the holding fix.

For complete coverage of changes in holding procedures, be sure to check the Airman's Guide or the latest revision to Section II, FLIP-Planning Manual.

Holding Entry Template

APPROACH, with the aid of operating squadron personnel, has devised a simplified ozalid template for use in specific entry to holding.

Figure 1 depicts the complete Standard Pattern Entry Procedures. The 70-degree line will be published on charts consistent with cartographic capability. The holding radial or aircraft heading upon arrival at the fix will determine the direction of turn.

Figure 1 is made from an ozalid process and being clear can be overlayed directly on the chart. Figure 2 is a decal, which can be stuck to the center of your E6B by removing the two side screws and sliding out the compass rose. In lieu of a decal, you could draw the lines on the computer surface with heavy india ink.

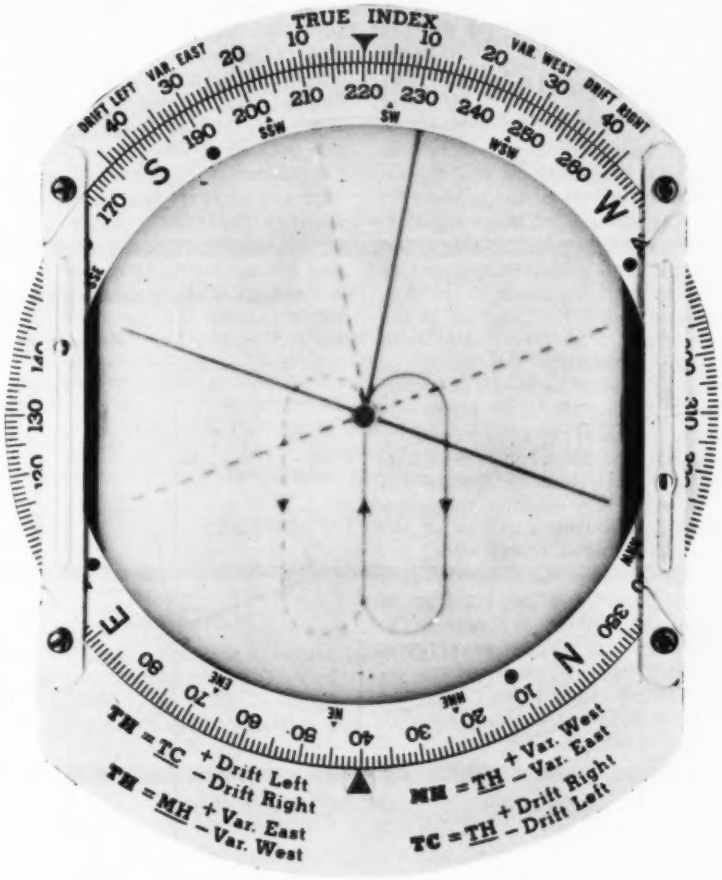

TRUE INDEX
DRIFT LEFT
VAR. EAST
VAR. WEST
DRIFT RIGHT
TH = TC + Drift Left − Drift Right
TH = MH + Var. East − Var. West
MH = TH + Var. West − Var. East
TC = TH + Drift Right − Drift Left

Fig. 3

This template was developed independently by APPROACH magazine. However, at least three enterprising civilian concerns have produced special computers for holding entry pattern procedures which were obtained during the process of preparing this article. (Information relative to these computers may be obtained by writing APPROACH).

Nonstandard holding patterns are identical to standard holding patterns, except that fix end and outbound end turns are made to the left.

Entry sectors to a nonstandard pattern are oriented in relation to the 70-degree line on the holding side just as in the standard pattern.

The APPROACH Template Holding Entry Aid is designed to be used separately as an ozalid aid or in conjunction with the E6B as a decal as indicated in Figures 1 and 2.

Those activities with access to an ozalid machine can duplicate this example or if you have modifications to add or subtract,

please feel free to do so. If you come up with another workable idea, we would like to know about it and pass it along.

It is realized that this template is not the answer for all types of airplane drivers, so if you have a better mousetrap, please use it.

In operating the template it is only necessary to dial in the inbound course to the holding fix at the bottom of the computer. (For ease in reading this, it is recommended that some sort of scribe mark be made at the bottom of the E6B.) As soon as the holding instructions have been issued it is most important for the pilot to know in which sector he is flying. In most cases this may quickly be determined by noting the heading of the aircraft when pointing toward the fix, and then locating the heading on the compass rose of the computer. The factor which determines the method of entry into holding is the heading of the aircraft as it crosses the holding fix. Your entry procedure will be determined by following instructions for the sector you are in as illustrated in Figs. 1 and 2.

Refer to Fig. 3 and assume that the pilot has been told to hold on the 220 radial of XYZ omni station in a standard holding pattern. After setting the 220 radial under the true index mark at the top, he notes that the inbound course to the holding fix is 040 degrees, found at the bottom of the computer.

Assuming in the above case that the aircraft heading is 090 degrees the pilot quickly finds 090 degrees on the compass rose and notes that he is in the largest sector. This means that his entry pattern will be to proceed to the holding fix, make a right turn and commence holding since

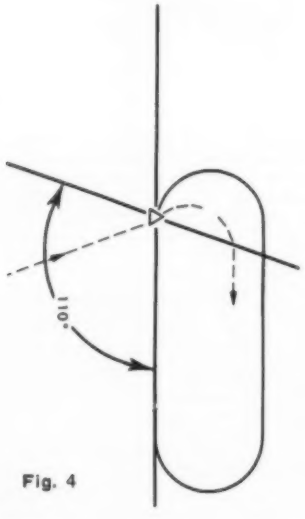


Fig. 4

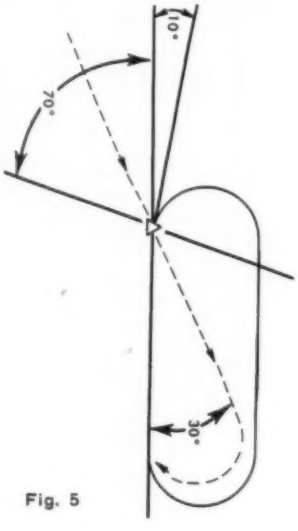


Fig. 5

he will be on the holding side, Fig. 4.

If the heading of the aircraft is 205 degrees, the pilot will proceed over the fix and fly a teardrop entry, Fig. 5, so as to approximate an outbound heading of 30 degrees or less to the holding course for not more than one minute, or one and one-half minutes if adverse headwinds are known to exist.

As an example for the remaining sector assume the pilot is flying on a heading of 260 degrees. His entry procedure here

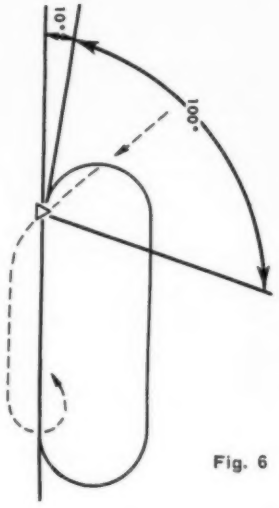


Fig. 6

is to cross the holding fix, Fig. 6, turning left to proceed outbound on the non-holding side approximately parallel to the holding course for 45 seconds or less at or below 14,000′ (one minute or less above 14,000′), then to turn toward, intercept and follow the 040 degree bearing to the fix.

If instructions are given to hold in a non-standard holding pattern the same procedures apply, except that the sectors are defined by the dotted lines and turns are made in the opposite direction.

When holding is to be accomplished on a range leg, homer or the tacan fix, the inbound course to the holding fix should be placed at the bottom of the E6B. Thus the inbound course to the holding fix will always appear at the bottom of the computer. Similarly as before a pilot can orient himself geographically by noting the heading which he is holding and locating it on the compass rose of the computer.

This particular template has depicted the standard holding quadrants in heavy black lines and the non-standard in dotted lines.

Here's to safe entry, holding and flying for all of 1962 and many years ahead. ●

COCKPIT. Selected Items From Aviation Safety Council Meetings

IFR in Marginal Weather

A comment was made on a near collision case where the pilot of an FAA aircraft arriving on an IFR clearance cancelled his clearance to proceed VFR upon receipt of the field weather, reported as being 2500′ broken with ½ to 1½ miles visibility. The FAA pilot requested a "control zone special VFR clearance," which was denied, whereupon he pulled up in front of a P2V on an actual GCA final. Pilots of both aircraft held visual contact with each other; however, the incident points up the necessity for continuing an IFR clearance when weather conditions are marginal.

—Alaskan Sea Frontier Safety Council

Tacan Check

It is a known fact that the Tacan needle will occasionally lock 40° off course during some approaches. One method of cross checking this discrepancy is currently squadron policy in VF-124. The ARA-25 is tuned to the station tower transmitter to check on the true position of the station.—*FAir Alameda*

Stop Keying the Mike

The safety officer noticed that many pilots have been deviating from correct R. T. procedure and are using mike clicks in lieu of voice in their inter-aircraft communications. With the number of commands assigned to a frequency, the click of a mike should have no meaning to a pilot other than someone is keying his mike. All pilots should stop this procedure.—*VS-29*

Descent Below 600′ on CCA

Four instances of pilots letting down below 600′ prior to picking up the meatball have been noted recently. In two cases the pilots appeared to be making *eyeball* approaches on a passenger liner in the vicinity of the carrier.

Action: Pilots will again be instructed that they are not to descend below 600′ in the CCA pattern unless one of the following conditions exist:

1. Meatball reported and *confirmed* by LSO.
2. CCA controller specifically directs descent to not lower than 250′ due to low ceiling or visibility.
3. LSO takes positive control and directs descent.

USS FORRESTAL Aviation Safety Council

notes from your flight surgeon

5 SECONDS *to go!*

During an instrument flight the engine of a TV-2 flamed out at 20,000 feet. After an unsuccessful relight attempt the pilot decided to make a flameout approach. At an altitude of 4500 feet in the abeam position for an approach to the runway the pilot aborted the approach and informed the dual pilot "we will eject." Lining the aircraft up parallel to the shoreline he told the dual pilot that the left arm rest locked the harness and to raise it. The dual pilot acknowledged this. The pilot then instructed him to position himself . . . "After raising the right arm rest the canopy will go, then hit the trigger and eject and I'll follow later." Apparently the dual pilot followed instructions because the canopy blew off almost immediately. The pilot waited about 5 seconds, then ejected. He was rescued from the water with only minor injuries.

The dual pilot received fatal injuries, apparently during manual bailout. Investigation of the recovered ejection seat showed it had not been fired and would have operated correctly if the dual pilot had squeezed the trigger. It will never be known if the dual pilot took the instruction to "hit the trigger" literally, but accident investigators considered this a strong possibility. The dual pilot was unfamiliar with the TV-2 escape system. His last formal physiology training was some 21 months before the accident. Nothing in squadron or personal logs indicated that he had recently refreshed himself on TV type ejection procedures.

"Training and periodic refresher courses on emergency procedures and escape systems

are a fundamental prerequisite if this type of situation is to be prevented," the AAR stated. It is strictly a matter of self-preservation for pilots and crewmen to take the initiative to insure that they are thoroughly familiar with and know how to use the escape systems installed in the aircraft they are flying.

For Want of a Hat...

A PLANE handler stepped from an HSS-1 being towed by tractor from the flight line to the hangar to retrieve his hat. As he attempted to step up on the strut and reboard the slowly moving aircraft, he slipped and fell on the starboard main gear and wheel. The brake rider, seeing him fall, immediately applied the brakes and yelled for the tractor driver to stop. The plane handler was pushed along the ground about 3½ feet. His injuries were two broken ribs, a punctured lung and a broken shoulder blade.

Live Ammo

ON RETURN to the line after a strafing flight, the pilot of an A4D reported that the left machine gun did not fire, apparently due to a feeder system jam. A member of the maintenance crew assigned as troubleshooter cycled the gun by hand with live ammunition. He thought 20mm. machine gun ammunition safe to handle as long as there was no electrical source to fire it off.

The projectile on the second cycle apparently did not eject and the third projectile cycled exploded. The fragments produced multiple wounds in the crewman's left arm, left leg and abdomen and kept him on the sick list for 10 days.

This incident indicated a lack of training, faulty judgment and a lack of proper supervision.

Dieting *vs.* Starving

PILOTS should be reminded that *dieting* is not synonymous with *starving*. Attempts to lose weight by skipping meals put the body in a fasting state. This reduces "aviation readiness" and increases the hazards of aviation by producing physical unreadiness for unexpected or emergency flight maneuvers.—*From an MOR*

Passengers' Safety

An HOK-1 pilot landing to pick up two passengers found there were three. He instructed his crew chief to remain behind and told him to give his APH-5 helmet and life vest to the third passenger, a non-aviator ground officer. The passenger refused to accept the helmet. After twice asking the passenger to wear the helmet, the pilot did not insist. On takeoff, the helicopter lost altitude and crashed. Luckily, all four occupants escaped uninjured.

Under normal circumstances, a pilot should never take off unless all occupants of his aircraft are wearing protective equipment. Their safety is *his* responsibility.

How's Your Night Vision?

MAYBE you're smoking too much. Night vision definitely is impaired by smoking 20 to 30 cigarets a day. The following table shows the reduction in night vision effectiveness at altitude, between non-smoker and smoker:

Altitude	*Non-smoker*	*Smoker*
0-4000	100%	80%
6000	95%	75%
10,000	80%	60%
14,000	65%	45%
16,000	60%	40%

—*Flight Safety Foundation, Inc.*

Copter Caper

TWO PILOTS landed their helicopter in a swampy wooded area after inadvertently touching blades with another helicopter in a Marine Corps fly-by.

The No. 4 helicopter of the division picked them up. The copilot climbed down from the cockpit into the passenger compartment to operate the hoist because there was no crew chief aboard. *He did not know where the rescue gear was located.* Fashioning a rescue sling out of a cargo strap, he attached it to the rescue hoist and raised both men separately into the aircraft.

Because of the basic mission of helicopters in the Marine Corps, the rescue aspect of helicopter operations has received relatively little attention in this unit, the reporting flight surgeon stated.

Minor Illnesses

THE common cold, digestive upsets and other minor illnesses, which do not seriously handicap individuals in other pursuits, may produce intolerable impairments in flying personnel. Inflammation accompanying a cold can cause extreme discomfort during altitude changes and painful, distracting injury to the ears and sinuses may result. Distention caused by gas in the stomach or intestines may give rise to symptoms varying in intensity from mild discomfort to incapacitating pain.

There should be a general awareness of the fact that flying renders seemingly minor conditions, described as feeling "poorly," "not up to par," "bushed," "under the weather," and the like potentially most hazardous. Flights should not be undertaken when there is any question regarding the fitness of the individual pilot or aircrewman.—*OpNavInst 3740.7, 25 June 57* ●

The category of failures ranges from fuel tanks to cells, lines, hose valves and associated components—on the ground and in the air.
FUEL

The fuel system is a most vital link in safe aircraft performance. It follows therefore, that any failure/malfunction or mismanagement of the system usually results in loss or damage of aircraft and injuries to personnel.

During a 15-month period of observation it was found that 8.6% of all the aircraft accidents occurring to the aircraft considered involved fuel system failure. This indicates a definite decrease in comparison to the previous period of study during which the fuel system was determined to be a causal factor in 9.9% of all accidents. However, the fatality rate for fuel system involved accidents increased from 1 fatality in every 10 accidents during the initial observation period to 1 fatality in every 6 accidents during the period just completed.

Of 94 reported occurrences involving the fuel system during the 15-month period 37 were reported as aircraft accidents and the remainder as flight incidents, hazards or ground accidents. These occurrences resulted in the loss of six lives and $15,269,550.

A breakdown by model of aircraft shows the A4D with 13.8% and the F8U with 11% heading the list of fuel system induced accidents with the highest percentage of this type of failure. It is interesting to note however, that the F11F, which now operates primarily in training commands, had no accidents due to this causal factor.

A closer examination of the components reported as factors in fuel system failure reveals that 65% of the reported occurrences involved material failure, 23% involved maintenance error and 12% involved design. These figures indicate that material failures have declined by a small percentage; however, this decline was offset by the increase in maintenance error and design factors. The number of reported occurrences continues to average approximately 6 per month.

The following briefs of selected occurrences are presented as representative examples of each of the fuel system problem areas.*

Fuel System Integrity

This category includes the fuel tanks, cells, lines, hoses, valves and associated components other than those defined in the succeeding categories.

a. Of 24 occurrences within this category, 8 were attributed to material failures. For example:

(1) After ground check of air refueling system, the aircraft was taxied back to the flight lines, where a fire was discovered in the aft tail section. Cause of fire was attributed to a leaking fuel vent mast overboard coupling assembly. The aircraft received minor damage. No injuries.

(2) On a sixth GCA, the pilot reported fire in the cockpit. Attempts to extinguish the fire were unsuccessful and the aircraft crashed three miles from runway. Cause of fire was the extreme deterioration of the gasket between the connecting fuel hose assembly and the forward fuel cell permitting a substantial fuel leak. Fuel ignition was probably due to hot ADU gases or generator electrical sparks. The accident resulted in strike damage to the aircraft and fatal injuries to three crewmen.

b. In addition, there were 16 occurrences involving maintenance error. For example:

During pressure refueling of aircraft, the plane captain had the Buckeye fuel nozzle partially attached when full pressure was turned on by second plane captain. High pressure fuel

** A complete listing of fuel system failure occurrences by model aircraft under the title of Survey of Performance of Aircraft Fuel Systems in Selected Jet Aircraft is available from the U.S. Naval Aviation Safety Center, ATTN: Safety Education Department.*

SYSTEMS

sprayed into the hot section of the aircraft and a fire resulted. Maintenance error was noncompliance with existing instructions. Overhaul damage was received by the aircraft. There were no injuries to personnel.

Following takeoff, pilot noticed fire warning light ON, accompanied by smoke in the cockpit. An immediate landing was accomplished. Investigation revealed that the primer solenoid functioned irregularly and all B-nuts attaching fuel lines to the manifold T-fitting were loose. Resulting fuel leakage caused a fire in the aircraft engine compartment. The fire resulted in total loss of the aircraft. There were no injuries.

Aircraft wing cell ruptured due to over-pressurization following pressure refueling operations. Electrical power was not applied for pre-fueling checks nor were the gravity filler caps removed in accordance with the HMI. Substantial damage to the aircraft without injuries to personnel was the result.

Fuel Control

Of the total occurrences 21 involved a fuel control material failure. For example:

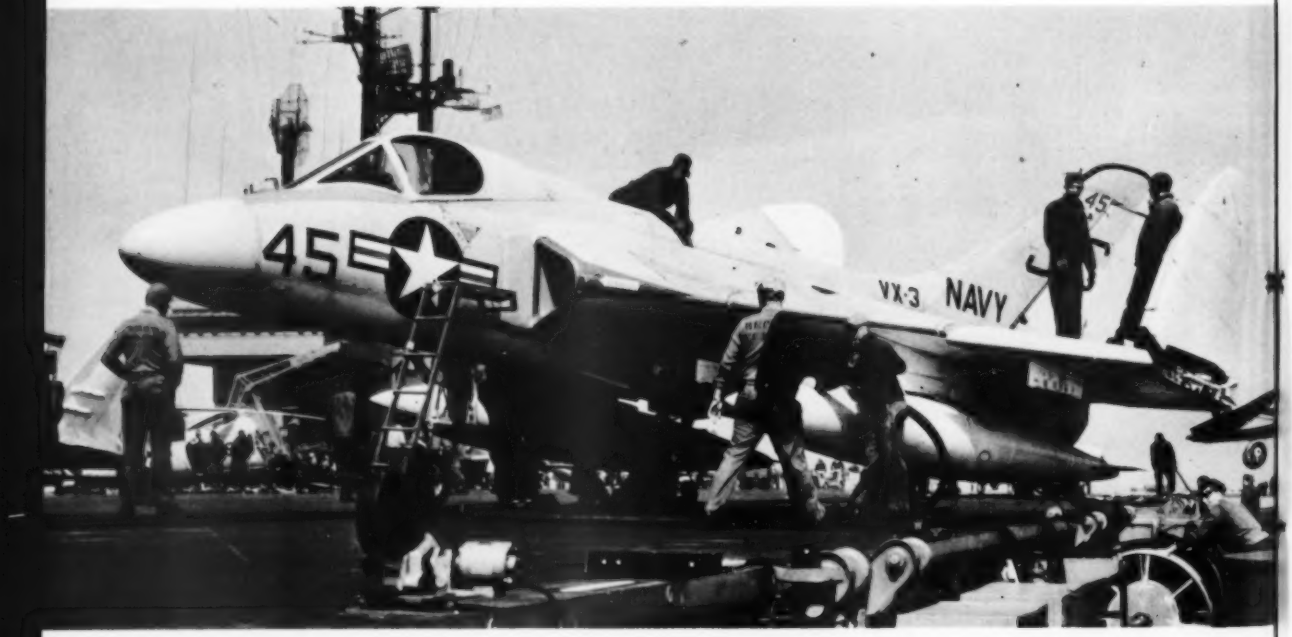
After turning downwind for landing the aircraft developed excessive sink rate and crashed into the trees. DIR of the fuel control revealed that the enrichment diaphragm had ruptured, key washer was missing and nut 195855 was loose. Either the ruptured diaphragm or the loose nut could have caused excessive fuel flow resulting in compressor stall. Strike damage and one fatal injury.

During a test flight at 45,000′, the pilot attempted to accelerate from idle to 90%. The engine chugged followed immediately by a flameout. Relight was successful at 25,000′ and pilot continued the flight. Investigation revealed a lean condition on the sea level acceleration schedule of the fuel control. Flameout is believed due to rich blow out.

Following normal light-off, fire was discovered in the afterburner section. The throttle failed to shutdown engine necessitating shutdown with the engine master switch. Fuel control failure was due to actuating shaft separating from diaphragm allowing unregulated fuel flow.

One fuel control occurrence involved design.

The aircraft responded satisfactorily on the second carrier approach until 600′ aft of the ship where a high sink rate positioned the aircraft well below the glide path. Throttle was advanced but without reaction from the engine the aircraft con-



Since this study airborne refueling equipment failures and malfunctions have doubled.

tinued to settle, struck the ship's ramp, and was subsequently arrested by no. 1 wire. Design deficiency of the Bendix TJ-L2 fuel control was considered primary cause factor of the accident. Substantial damage was sustained by the aircraft with minor injuries to the pilot.

Fuel Pumps (Boost, Engine & Afterburner)

In this category 13 of 16 occurrences were attributed to material failure.

After a flameout at 33,000′, the pilot attempted four relights without success. A flameout landing was accomplished. Investigation revealed engine failure resulting from a defective rear fuel pump.

Following an attempted afterburner relight, the pilot experienced an explosive light-off and flameout of the basic engine. A normal relight was obtained and pilot landed the aircraft without further incident. Cause of failure was attributed to a faulty DC boost pump.

Three remaining occurrences involved maintenance error. For example:

Climbing through 32,000′ the engine RPM decreased from 98% to 93% followed by a flameout. A relight was accomplished and a normal landing executed. Cause of the flameout was the lack of fuel boost pump pressure. The fuel pump failed to operate due to reversal of phase A and ground leads to the fuel tank pump causing the phase A fuse to blow when engine was ground tested.

Pilot experienced flameout at 29,000′. Investigation revealed forward fuel pump was not connected due to oversight of maintenance personnel.

Airborne Refueling Equipment

Occurrences in this category refer to malfunctions associated with the refueling package (i.e., buddy store) and do not pertain to discrepancies of either the tanker or receiver aircraft.

Of the 18 occurrences in this category, 9 were directly attributable to material failure. For example:

During an air refueling operation, 33′ of hose separated from the buddy store and trailed back over the wing and fuselage of the receiver aircraft. Investigation revealed the guillotine had been fired due to a suspected short circuit.

After completing an air refueling mission, the pilot noted fuel siphoning from the aircraft's air fueling probe. Fuel entered the engine intakes and was then ducted via the air-conditioning and

pressurization system into the cockpit. Investigation after landing revealed the air fueling probe nozzle failed to close properly, allowing fuel in the probe to siphon into the airstream.

Eight of the occurrences involved a design deficiency. An example:

During air refueling, continued forward movement of the aircraft caused the drogue to whip and hit the canopy, making it shatter. Design factor assigned since pilot cannot see the drogue or probe during air-refueling plug-in.

One occurrence was the result of maintenance error:

Subsequent to a normal plug-in, the refueling hose developed excessive slack which whipped into the airstream and then separated at the paradrogue connection. Examination of the fueling components indicated that maintenance personnel had failed to remove the refueling store snubber pin prior to flight. With the snubber pin installed, the reel was restricted from rotation.

Transfer Fuel System

This category includes fuel transfer pumps, valves, lines, hoses, indicators and associated wiring.

Of the 9 occurrences within this category, 8 were attributed to a material failure.

Upon returning to the carrier, the pilot noted a severe fuel shortage. A carrier approach was initiated, but the aircraft flamed out, and the pilot ejected. Cause of fuel starvation was the failure of the fuel level control valve which prevented fuel transfer from the wing to the fuselage tank. The aircraft was lost without injuries to the pilot.

The pilot ejected in time, but the plane was not so lucky. The engine flamed out due to a fuel control malfunction of an undetermined nature.

Immediately after takeoff, the pilot noticed a fuel transfer warning light. The aircraft flamed out prior to landing. Fatigue failure of the air turbine transfer pump shroud prevented fuel transfer, which coupled with an erroneous fuel quantity indicator, later resulted in strike damage to the aircraft.

One occurrence resulted from maintenance error:

During flight, the pilot was unable to transfer fuel from the aft tank to the main fuel cell and the aircraft was landed prior to flameout.

Investigation revealed that the fuel line between the aft tank and the main cell was left disconnected during maintenance of the fuel system.

Fuel Quantity System

This category includes fuel indicators, sensing probes, warning lights and associated wiring.

Of the 5 reported occurrences in this category, 2 involved material failure. An example:

Prior to takeoff, the aircraft fuel quantity indicator read 2600 lbs. Minutes after takeoff, the fuel transfer warning light came ON with a 200 lb. indication. The engine flamed out upon landing.

The occurrence was the result of a faulty fuel quantity indicator. The transfer warning light should have come ON at 1500 lbs.

Two occurrences were attributable to a design factor. An example:

During a gunnery flight, the pilot experienced a loss of fuel pressure with a subsequent flameout.

Investigation revealed a contributing cause factor of the design, due to the lack of fully auto-

A low level fuel warning light may have prevented this accident. In this case, the pilot became aware of the situation when the boost pump failure warning light illuminated.

A leaking mismated fuel vent line coupling caused the damage shown. White vapors and skin discolorations were noticed in tail break section between fuselage and ventral fin area.

matic transfer fuel system. The accident resulted in strike damage to the aircraft and minor injuries to the pilot.

One reported occurrence was the result of maintenance error:

Following a bombing mission, the pilot dumped 1000 lbs. of fuel in order to arrive at the ship at the proper landing weight. While orbiting the ship, the pilot declared an emergency since his fuel supply had decreased rapidly from 3000 to 1500 lbs. The aircraft flamed out one mile astern of the ship. Investigation revealed that the aircraft had a fuel quantity discrepancy of approximately 1200 lbs. during the preceding flight. This discrepancy was not corrected and the plane captain refueled the aircraft by gage rather than utilizing the automatic fuel shutoff. No injuries, but the aircraft was lost at sea.

No occurrences were reported during the 15 month observation period ending 1 July 61 which resulted from fuel contamination or icing, nor were any occurrences reported as a result of fuel system failure of an undetermined origin.

Conclusions are as follows:

- The percentage of accidents, in which the fuel system is a causal factor, has decreased slightly.
- Material failure as a primary cause of fuel system accidents has declined somewhat.
- Fuel system malfunctions/failures due to maintenance error show a significant rise.
- A slight increase in design as a causal factor is shown.
- Fuel system integrity and fuel control failures continue to constitute about 50% of all fuel system failures.
- Failures/malfunctions due to airborne refueling equipment have doubled since the initial report.
- Fuel contamination/icing has been eliminated as a causal factor during this period probably due to the high standards and concentrated efforts of personnel concerned with fuel storage and servicing systems.
- The F8U and A4D had the highest percentage of accidents due to fuel system failure.

As a result of these conclusions the following recommendations are made:

►That operating activities review and revise as necessary quality control and maintenance procedures so as to eliminate maintenance error as a causal factor in fuel system failure.

►That a review and examination be made of the fuel system in the F8U and A4D and whatever changes considered necessary to improve reliability be made.

►That BuWeps review fuel system specifications with the intent to improve the system in general and increase the reliability in service.

►That maintenance personnel follow prescribed procedures without deviation. Deviation from the correct procedure aside from being a direct cause of accidents introduces confusion factors into design and material discrepancies which delays corrective actions.

►And that equipment used for fuel system testing and servicing be subject to frequent checks for proper operation and capability to fulfill established requirements. ●

Two plane captains got their signals switched. One of them was refueling using a *Buckeye* fuel nozzle. Before he could properly secure the nozzle, the second plane captain turned the fueling valve on at the pump, causing fuel to spray out of the partially attached nozzle onto the hot section of the aircraft.

SOME THOUGHTS ON LOOSE HARDWARE

CALL it "hardware adrift" or "a foreign-object-accident trigger"; call it "cockpit contamination" or "poor housekeeping" or "crud"—you still have a hazard that cannot be excused or explained.

The degree of trouble that can result from such loose hardware is unpredictable. But, we can lessen the frequency of such incidents! We can design areas that are not susceptible to loose hardware trouble. We can provide covers for all electrical connections and moving parts. And above all, through better design we can reduce the number of parts that can become loose hardware.

Rarely in the course of Air Force endeavor has so much been done for so little:

After a normal flight, the pilot prepared to land the jet tanker. When the landing gear was lowered, the nose gear remained in the up and locked position.

All the following inflight attempts to lower the gear were unsuccessful:

- The gear was recycled twice.
- The emergency system was actuated.
- The gear was recycled again, the emergency system was again actuated, and more forward pressure was applied to the nose gear ground downlock and release handle.
- In an attempt to bleed off pressure, the left hydraulic system was depressurized with the pumps still running. The aircraft descended into warmer air to melt any possible ice, and emergency lowering of the gear was attempted while porpoising the aircraft to place both positive and negative G forces on the gear.
- The aircraft was climbed to 20,000 feet where two reverse refuelings with jet bomber were accomplished. Numbers 1 and 2 hydraulic pumps were shut off for five minutes to relieve pressure in the lines before the emergency system was operated again.
- The nose glass inspection plate was removed, and the T-fittings on the hydraulic lines to the up side of the locking mechanism and sequence valve were loosened to relieve any trapped pressure.

After all the possible emergency procedures were tried, it was decided to attempt a landing with the nose gear retracted. The runway was foamed and emergency procedures and computations were checked by operations personnel on the ground. Crash landing procedures were followed and the landing was successful with no major damage to the aircraft.

It could be assumed that the nose gear troubles

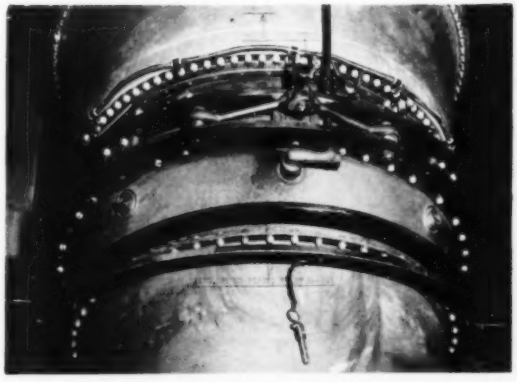
which involved so many people and required so much effort and time were caused by a complete failure of the hydraulics systems or some other major malfunction. But such an assumption would be completely wrong.

The cause of the nose gear malfunction was a small lockwasher wedged between the nose gear drag brace upper and lower links. Apparently the washer was dropped on the upper link when the nose wheel well light was changed just before takeoff.

A study is being conducted as to the effectiveness of a flexible accordion-type cover or rubber sleeve to fit over the knuckle of the upper and lower drag brace links to prevent foreign objects from falling into the links.—*General Dynamics "Design Safety Review"*

Before, Not After

THERE has been an alarming increase in those ground accidents involving poor headwork while towing aircraft or moving vehicles around aircraft. The apparent lack of interest shown by the drivers of vehicles is indicative of a lack of supervision before the mishap. Grandiose plans are indicated in the reports which will prevent the next accident, but the question is "Why was it allowed to happen?" The only way to prevent this type ground accident is by adequate training, procedures and supervision in short, **Command Attention.** —*ComNavAirPac*



ANYONE LOSE A SLING?

During acceptance check of an A3D-2 an engine sling, K5439464-501, was found installed and intact on the J57-P-10 engine. The aircraft had flown an estimated 85 hours in this condition. No damage to engine or nacelle. Address claim to Maintenance Officer, HATRon 10, c/o FPO, San Francisco, California.

Canopy Cable Clamp

Clamp for holding canopy cables for F9F-8T while moving or installing canopy designed by Henry L. Jayroe, AM2 of VT-21, NAS, Kingsville.

Two clamps are needed to secure the cables at the rotary actuator drum preventing them from retracting and becoming entangled, saving substantial man hours.

SNB Landing Gear Interference

A recent incident occurred in an SNB where it was discovered that there was no clearance between the primer handle and the landing gear control handle, allowing the primer to hit the landing gear handle. This could cause premature retraction of the gear in case of a bouncing takeoff.

Investigation disclosed that the gear handle was bent and the mounting plate was slightly out of position.

It is recommended that activities operating SNB aircraft insure that maintenance personnel have been instructed in proper clearance requirements. *FAirMed*

Devilish Demon

THE following is extracted from a recent study of F3H accidents spanning the full history of the aircraft:

Phase			Cases Where Handle and Gear Not in Corresponding Positions
Retracted during taxi	2		2
Retracted during takeoff	4		4
Extended at high speed	3		0
Unable to extend	7		0
Retracted on touchdown	5	(excludes hard-landing)	3
Retracted after shutdown	1		0
	22		9

Dollar loss: $2,831,000.

In three of these accidents witnesses or photo-

graphs confirm the fact that gear was down during final approach.

At least six unintentional gear retractions were preceded by work which required that the gear handle be placed UP with the gear extended.

Unsafe features of the F3H landing gear are:

a. Necessity for gear handle to be UP before transferring fuel.

b. Lack of positive detent retention of gear handle—UP and DOWN.

c. Position of handle (partially hidden by glare shield) and highly susceptible to inadvertent actuation by pilot (3 occurrences).

d. For emergency extension, necessity for pilot to *hold* control in order to keep air pressure working until gear has completed extension.

Closely related, difficult of positive proof, but of obvious implication is the unsatisfactory position of the landing checklist which is hidden by the radar scope.—*Crossfeed 10-61*

Propeller Loss

ABOUT three hours following a night shipboard takeoff and without advance warning, sounds described as an explosion were heard by all members of the S2F crew. The aircraft swerved to the left and the pilot's plexiglas window was shattered. The pilot immediately leveled the wings, commenced a climb and executed single-engine procedures.

When well established in the climb, control was passed to the copilot and the pilot visually inspected the port nacelle with a flashlight. He discovered that the port propeller assembly was completely missing and extensive damage occurred to the cowling and nacelle. In addition, the fuel level in the port tank dropped immediately from 700 to 150 pounds. Aileron control was difficult, presumably due to damage to the system and balanced flight could not be attained.

Enroute to the ship the slow flight characteristics were tested and found satisfactory. However, it soon became apparent that fuel consumption vs fuel available might preclude reaching the ship. The port fuel tank was selected but only a few minutes of fuel was available. The fuel selector was shifted back to the starboard tank and normal engine operation was regained.

About six miles astern of the ship the engine lost power due to total fuel exhaustion. The windmilling prop provided sufficient electrical power and hydraulic pressure to accomplish a successful night instrument ditching. Water contact was at 78 to 80 knots with full flaps. All crewmembers evacuated the aircraft through their respective overhead hatches and climbed aboard the Mk-4 raft which ejected and inflated normally on impact.

Investigation by the Board came up with various possibilities as to the cause of the loss of the propeller. It was noted that the propeller had not been re-torqued after the first flight following installation. Space available prohibits publishing the pilot's statement at this time. It indicates that the pilot had pre-planned the possibility of a night ditching and had procedures well in mind. Obviously someone trained him well—probably a squadron effort, judging from the reaction of the entire crew to the emergency.—*Crossfeed 10-61*

Fuel Tank Sealing

THE truth about fuel tank sealing is that successful sealing depends largely on the rigid conformity to tank sealing gospel as outlined in the manuals.

This has been proved by the fact that tank problems in the past have diminished to the minimum following training revivals in the stinking art of slobbering exactly the right goo in precisely the right place after the area is made chemically pure.

Simply grabbing a can of some sort of sealing material and making a pass at a suspected area with a goo laden stick doesn't stop the drips.

Recently several leaking wings have revealed incorrect compounds or in some instances just the EC-776, finish coat, without the basic EC-801 under it. Putting fresh material on old leaky sealant doesn't work—. When you isolate the leak, you have to remove all the old material down to the metal and be very, very thorough and clean about it.

When integral tank wings were first put into service on the R5D and the early Constellations, tank sealing was a major problem that attracted prolonged attention from the best operating maintenance brains in the business. It was years, not 'till after the war, that satisfactory materials and techniques were developed to attain commercially acceptable tank jobs. We mention this to stress the point that there is far more to it than meets the eye, and the present methods were long in the making from painful years of trial and error. The Convair 240s and DC-6s are basically much better structurally for more positive sealing, but the same sealing techniques still apply and whenever we let our tank sealing thinking and practices deviate from the "good book" on the subject, the undersides of the wings show the tell tale signs of the drizzles.

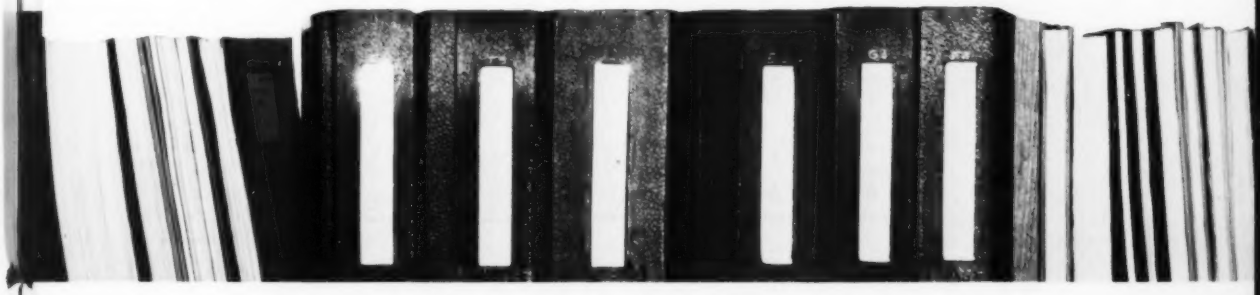
When confronted with a tank problem, if you don't know the materials and methods go grab the book or better seek the advice of some grizzled old tank man that's been there. As mentioned before—

training in the art pays off—have someone who knows give you a little dual before you solo into the dark, stinking regions of tankville. Find out about all the personal protective devices and safety precautions too.—Refer to Structural Repair Manual.—*AA Weekly Maint. Ltr.*

Part Substitutions

The R5D was at 8000 feet, 100 miles from Gitmo when spray and smoke were detected coming from the exhaust stack area of no. 2 engine. The engine was secured and the airplane diverted to Homestead AFB for an emergency landing. The emergency air system was used to stop the plane because all hydraulic fluid was lost. Investigation revealed that an *aluminum* hydraulic line to no. 2 engine split, allowing loss of hydraulic fluid. A fire was averted only by the timely discovery of the failure. The *aluminum* line was erroneously substituted for the proper high pressure steel line during an engine change at a transient field.

Aluminum tubing should not be used to replace steel tubing on high pressure hydraulic systems. Substitution of any piece of aircraft hardware is a serious departure from sound maintenance procedures and can result in the loss of an aircraft and crew. Substitution of aircraft parts must be strictly controlled. Substitution of any part must be with an approved like part and then only with the authorization of maintenance supervisory personnel.



Use the Proper Handbook

AN attempt to perform a job without the proper instruction is as grave an error as an attempt with no instruction at all.

All publications are prepared for a specific purpose, and should be so used. If this were not necessary then all the different types of information would be put into one book.

In analyzing the reasons why some people fail to use the proper manual, one must resort to conjecture. Some of these reasons then may be due to:

1. Failure to obtain the proper handbook.
2. Ignorance of the existence or of how to identify a handbook needed.
3. Attempting to use the wrong manual, simply because it happens to be handy.

The last reason noted above is probably the most glaring violation of sound practice. Specifically, the use of the Illustrated Parts Breakdown in lieu of the Handbook of Maintenance Instructions is a very bad habit. The pitfalls of such practices are not necessarily evident.

The Illustrated Parts Breakdown is used to *identify* parts. The Handbook of Maintenance Instructions for the airplane, and the Handbook of Service Instructions for equipment are used for *maintenance* purposes.

If an occasion arises wherein an illustration is more clearly defined in the IPB than in the HMI, then it is naturally advantageous to use it. *Using this illustration does not preclude following the instructions in the HMI.*

Some of the reasons against using the IPB for other than the intended purpose follow:

The IPB does not indicate:
The Maintenance procedure—
Sequence of procedure—
Warnings, notes or cautions—
Dimensions—
Functional test or operation—
Tools—
Torque value—
Trouble shooting, etc.

One of the very best ways to strengthen Murphy's Law, is join the ranks of those misguided mischief makers, who think that rules are for fools, and books are for snooks.—*McDonnell Field Service Digest.* ●

MURPHY'S LAW*

Tracker/Trader Double Cross

On runup, subsequent to completion of a 1st major inspection, a functional check of various hydraulic systems was commenced after the crew had checked the hydraulic pressure gage to assure system pressure of 1500 psi. The flap control handle was placed DOWN but flaps would not extend. The hydraulic reset button and system selector were rechecked and the crew again at-

tempted to lower the flaps with negative results. The crew shut down engine power and were leaving the aircraft to check the maintenance manual when the nose wheel retracted slowly. The aircraft came to rest on the nose wheel doors.

Maintenance personnel completed hydraulic repair work and failed to properly identify each line's installation. A cross-connection occurred resulting in pressure to the up-side of the nose gear actuating cylinder with the landing gear in the down position. The nose wheel clamp was installed but it could not be determined if this was installed properly. The clamp screw was broken with no evidence of fatigue. It is doubtful that the clamp was properly installed, inasmuch as if it were properly attached, the nose wheel would not have collapsed.

Comments of the Board

The installation area, where work was completed in this aircraft, is conducive to the possibility of a Murphy's Law installation. (*Four similar hydraulic line connections are situated on a horizontal plate.*)

The forms utilized by the Quality Control Division in reporting a discrepancy do not include provisions to indicate what work in correcting the discrepancy was actually performed.

Personnel performing the installation did not identify and mark the lines replaced or disconnected. Supervisory personnel completed line pressure checks without positively identifying the route of flow to various components.

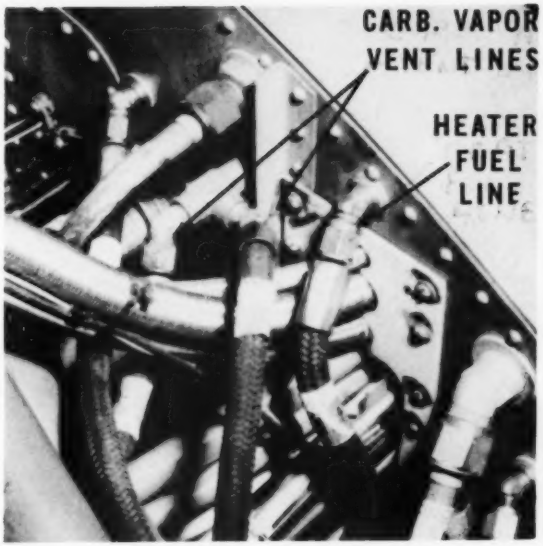
Recommendations

►It is recommended that should more than one hydraulic line or other system line be removed in close proximity to other like lines, that positive steps be taken to ensure that all lines are properly marked for identification.

►A working diagram should be drawn of the lines or parts to be worked on before any disassembly is conducted.

►Inspectors be made aware of the work actually performed, so that inspections can be made for proper installation as well as for integrity. In order to fulfill this requirement, it is recommended that a revised aircraft maintenance form be used.

►All personnel working on the S2F aircraft be reinstructed on the proper installation of nose wheel downlock safety clamps and main mount safety clamps.



TF Murphy

A momentary engine cutout in flight and an intermittent fuel pressure fluctuation was the discrepancy which caused us to stumble into another MURPHY in a transient TF-1.

Photo shows cluster of 3 fuel lines involved located at the top, upper inboard accessory section. These lines are within a 3-inch area. Two of these lines are carburetor vapor vents and are normally connected to the Y-fitting at the wing butt. The other line is a fuel feed line for cabin heater.

This is what happened: These fuel lines were disconnected to facilitate the installation of an ASC on a fuel tube. Upon reconnection of these lines the mechanic crossed the carburetor vapor vent line from chamber "E" with the fuel feed heater line. As a result fuel vapors in chamber "E" of the carburetor were not expelled back to the fuel tank but trapped in the fuel heater line. The lack of fuel vapor elimination caused the momentary engine cutout. The fuel pressure fluctuation was recorded on the fuel pressure gage due to fuel pressure being trapped off "E" chamber at the carburetor.

To prevent a recurrence of this situation, it is suggested that these connections be color coded (paint B-nut and fitting with matching colors.)

—Contributed by Frank Cordaro, ADRC AMD, NAS New York ●

*If an aircraft part can be installed incorrectly, someone will install it that way!

NATOPS

NATOPS

As this was written, the major portion of fleet and other personnel conducting the Naval Air Training and Operating Procedures Standardization Program were in session down south. It was really their first opportunity to have a good look at what has been accomplished so far.

Much progress has been made. APPROACH feels this for a number of reasons. A daily review of the message traffic, and all the many formal and informal reports coming to NASC, reveal that originators are analyzing unfortunate events and preventive safety of flight situations with a deeper appreciation.

There must be a vigilant determination by all to insure that NATOPS is and will remain a command standardization tool to strengthen, not dilute, command authority and responsibility.

lift and drag

The standardization evaluation of pilots will include open and closed book written examinations and oral ground phases (with OFT and NAMO if available), followed by flight checks. This will provide commanding officers with valuable factual and objective measurements of individual and unit capabilities. When weaknesses are apparent, the system provides the CO with the opportunity, information and time to concentrate training emphasis where it is most needed. Pilots will emerge from evaluation as (1) "Qualified", (2) Conditionally Qualified" (requiring training emphasis in non-critical techniques or procedures), and (3) very rarely "Not Qualified".

The recent LSO conference at Norfolk is another ripple. Typical of the response is the fact that what was originally announced on relatively short notice and envisioned as a small task force to draft a rough of the LSO stan manual, drew platform types from both fleets, commands, and CNO. NASC took advantage of its cost free travel location and observed.

Space doesn't permit review of other signs of a healthy growth of increased professional application to solving of the risk problems facing Naval Aviation. APPROACH hopes to see a further reemergence of the creative spirit and technical and professional advancement which so characterized Naval Aviation in earlier years when development break-throughs and records were predominantly Navy.

FOD

FOREIGN OBJECT DAMAGE

This sculptured metallic masterpiece was the result of one day's runway sweeping.

THIS IS TO REMIND YOU
NOT TO READ IN FLIGHT!